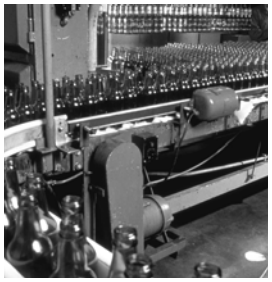
CompactLogix Indexing Motion Accelerator Toolkit



Quick Start

Hardware Selection
Plan System Layout
Plan System Wiring
Motion Logix Integration
Motion FactoryTalk View Integration
Motion System Application Guide

Allen-Bradley • Rockwell Software

Rockwell Automation

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://literature.rockwellautomation.com) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

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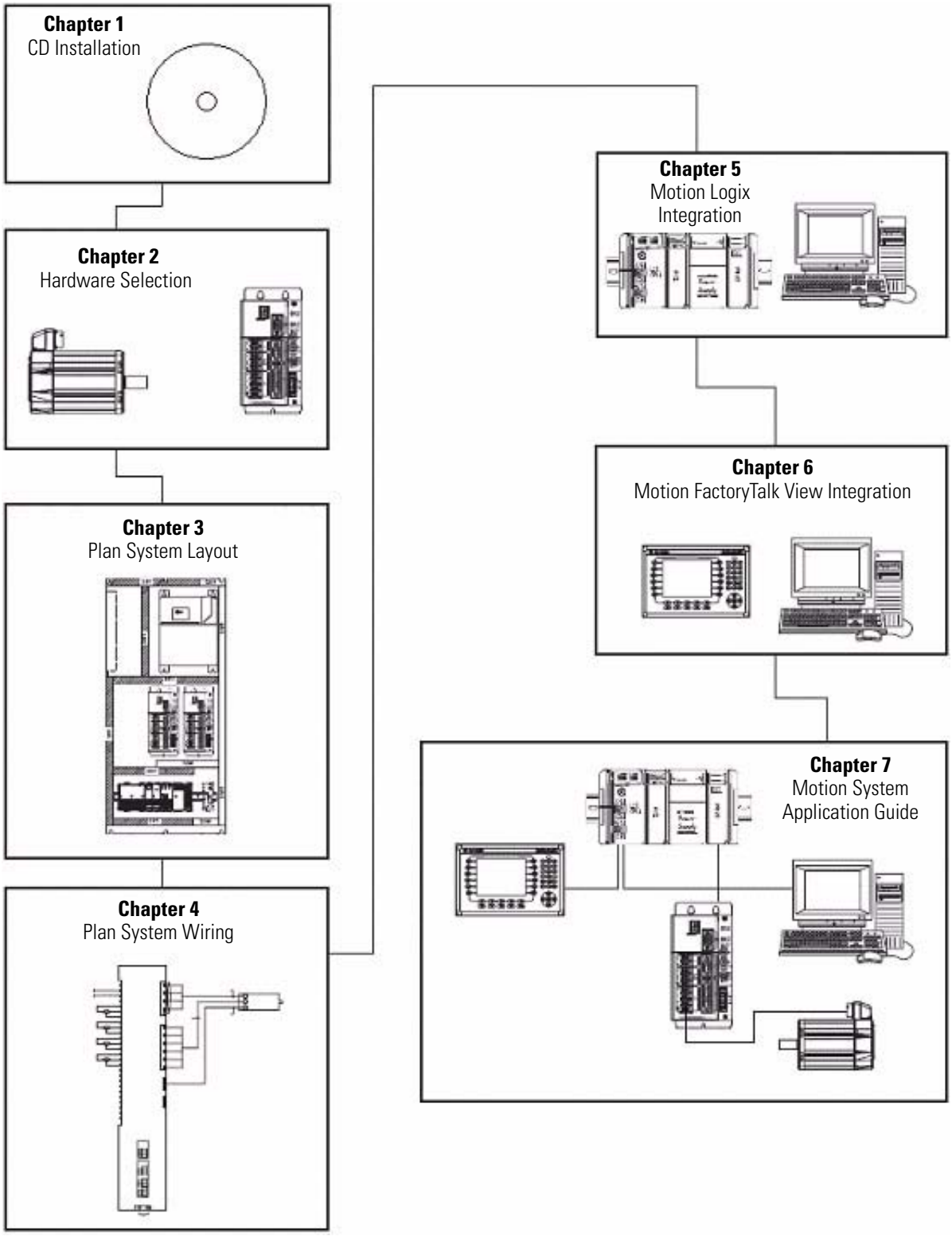
Follow the path below to complete your CompactLogix Indexing Motion application.



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Introduction

This quick start provides examples of using a CompactLogix controller to connect to multiple devices (servo drives, motors, and HMI) over the Ethernet/IP network in a CompactLogix Indexing Motion application. These examples were designed to get devices installed and communicating with each other in the simplest way possible. The programming involved is not complex, and offers easy solutions to verify that devices are communicating properly.

To assist in the design and installation of your CompactLogix Indexing Motion system, application files and other information are provided on the Kinetix Accelerator Toolkit CD, publication IASIMP-SP004. The CD provides CAD drawings for panel layout and wiring, base Logix control programs, FactoryTalk View (HMI) application files, and more. For a copy of the CD, contact your local Rockwell Automation distributor or sales representative. With these tools and the built-in best-practices design, the system designer is free to focus on the design of machine control and not on design overhead tasks.

To download the program files, CAD files, and other selected CompactLogix Indexing Motion Accelerator Toolkit information, refer to the Rockwell Automation Integrated Architecture Tools website, http://www.ab.com/go/iatools.

IMPORTANT Before using this quick start and the contents of the Kinetix Accelerator Toolkit CD, read the Terms and Conditions READ ME.pdf on the CD.

The beginning of each chapter contains the following information. Read these sections carefully before beginning work in each chapter.

- **Before You Begin** - This section lists the steps that must be completed and decisions that must be made before starting that chapter. The chapters in this quick start do not have to be completed in the order in which they appear, but this section defines the minimum amount of preparation required before completing the current chapter.
- **What You Need** - This section lists the tools that are required to complete the steps in the current chapter. This includes, but is not limited to, hardware and software.
- **Follow These Steps** - This illustrates the steps in the current chapter and identifies which steps are required to complete the examples using specific networks.

Required Software

To complete this quick start, the following software is required.

Rockwell Automation Software	Cat. No.	Minimum Version
RSLogix 5000 Mini Edition	9324-RLD200ENE	17
FactoryTalk View Studio for Machine Edition (Includes RSLinx Enterprise and RSLinx Classic)	9701-VWSTMENE	5.00
Ultraware Drive Configuration Software for the Ultra3000/5000	2098-UWCPRG	1.64
RSNetWorx for DeviceNet	9357-DNETL3	8.00.02
RSLogix 5000 DeviceNet Tag Generator Tool	Provided on Toolkit CD	Build 87
Motion Analyzer/Motion Selector CD	Download from http://ab.com/e-tools	4.*x*
Kinetix Accelerator Toolkit CD	IASIMP-SP004	—

Conventions Used in This Manual

This manual uses the following conventions.

Convention	Meaning	Example
click	Click left mouse button once (assumes cursor is positioned on object or selection). Click button to initiate action.	Click Browse.
double-click	Click left mouse button twice in quick succession. (Assumes cursor is positioned on object or selection.)	Double-click the H1 icon.
right-click	Click right mouse button once. (Assumes cursor is positioned on object or selection.)	Right-click the Fieldbus Networks icon.
drag and drop	Click and hold the left mouse button on an object, move the cursor to where you want to move the object, and release the mouse button.	Drag and drop the desired block into the Strategy window.
Select	Click to highlight a specific option.	Select H1-1 from the list.
check/uncheck	Click to activate/deactivate a checkbox.	Check the Do not show this dialog again checkbox.
>	Shows nested menu selections as menu name followed by menu choice.	Choose Programs>Rockwell Automation >Simplification>Kinetix Accelerator Toolkit. **Note: The path sequences given in this manual are for a typical system installation. If your system was installed in a different directory, use the appropriate path.**
expand	Click the + to the left of a given item/folder to show its contents.	In the H1-1 window, expand the FFLD.

Additional Resources

Resource	Description
http://www.ab.com	Provides access to the Allen-Bradley website.
http://rockwellautomation.com/knowledgebase	Provides access to self-service support.
http://www.rockwellautomation.com/components/connected	Provides access to the Connected Components website.

Notes:

CD Installation

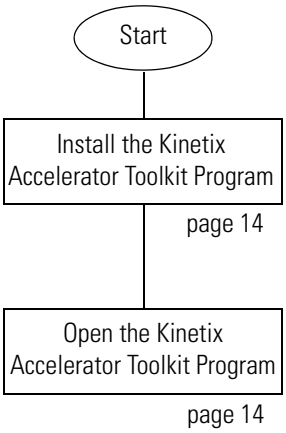
In this chapter, you install the Kinetix Accelerator Toolkit program CD to your personal computer. All of the necessary files are transferred to the personal computer for ease of use.

What You Need

- The Kinetix Accelerator Toolkit CD, publication IASIMP-SP004
- Personal computer with:
  - an Intel Pentium II or greater microprocessor
  - 128 MB of RAM for Windows NT, Windows 2000, Windows 2003, Windows 2003 R2, or Windows XP (64 MB for Windows 98) operating systems
  - 300 MB of available hard-disk space

Follow These Steps

Complete the following steps to install the Kinetix Accelerator Toolkit program.



Install the Kinetix Accelerator Toolkit Program

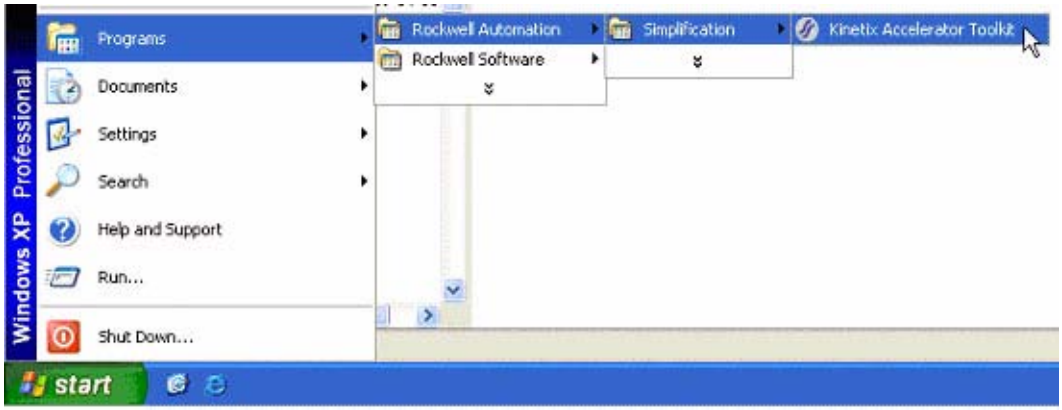
Follow these steps to download and install the Kinetix Accelerator Toolkit program from the CD.

1. Place the Kinetix Accelerator Toolkit CD, publication IASIMP-SP004, in your CD tray.
2. The installation program should run automatically. If not, browse to the CD and run the file Setup.exe.
3. Follow the on-screen instructions to complete the program installation.

Open the Kinetix Accelerator Toolkit Program

Follow these steps to begin using the Kinetix Accelerator Toolkit program.

From the Start menu, choose Programs>Rockwell Automation>Simplification>Kinetix Accelerator Toolkit.



The Kinetix Accelerator Toolkit program starts.

Follow the steps in the remaining chapters of this manual to complete your system configuration.

Notes:

Hardware Selection

In this chapter, you make your motion application hardware selection. You can select from the basic motion control panels, or use Motion Analyzer software to size your servo drive and motor.

The basic motion control panels can be modified with up to four axes, a different PanelView Plus terminal, and other optional equipment.

Before You Begin

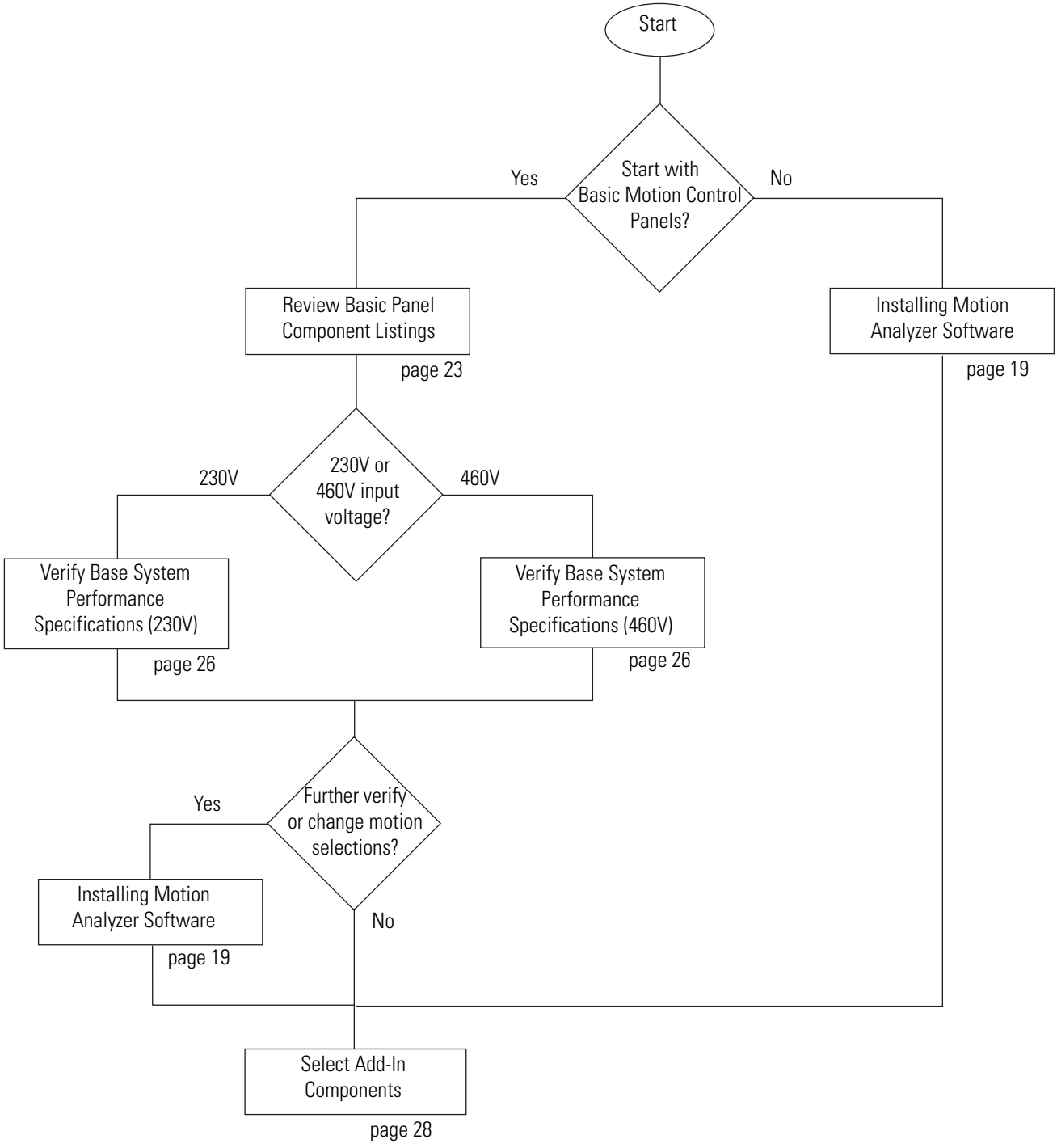
- Determine your base motion system input voltage.
  - 400/460V
  - 200/230V
- Verify that your computer meets the software requirements of Motion Analyzer software, version 4.*x*.
- Complete the Kinetix Accelerator Toolkit CD installation (Refer to Chapter 1).

What You Need

- Kinetix Accelerator Toolkit CD, publication IASIMP-SP004. For a copy of the CD, contact your local Rockwell Automation distributor or sales representative.
- Personal computer with Internet access for downloading software.
- Motion Analyzer software, version 4.*x* is available from:
  - the Kinetix Accelerator Toolkit CD, publication IASIMP-SP004
  - http://ab.com/e-tools
- Kinetix Motion Control Selection Guide, publication GMC-SG001.

Follow These Steps

Complete the following steps to select your motion system hardware.



Installing Motion Analyzer Software

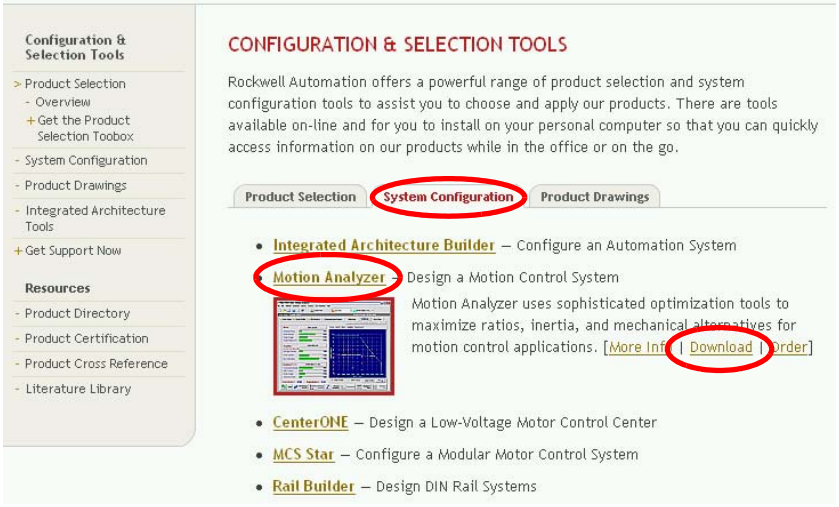
Motion Analyzer software is a comprehensive motion control tool with application analysis software used for sizing your application. You can download and install Motion Analyzer software from the Web, or install Motion Analyzer software from the Kinetix Accelerator Toolkit CD, publication IASIMP-SP004.

Download Motion Analyzer Software From the Web

Follow these steps to download and install Motion Analyzer software.

1. Open your Web browser and go to http://ab.com/e-tools.

   The Configuration and Selection Tools webpage opens.

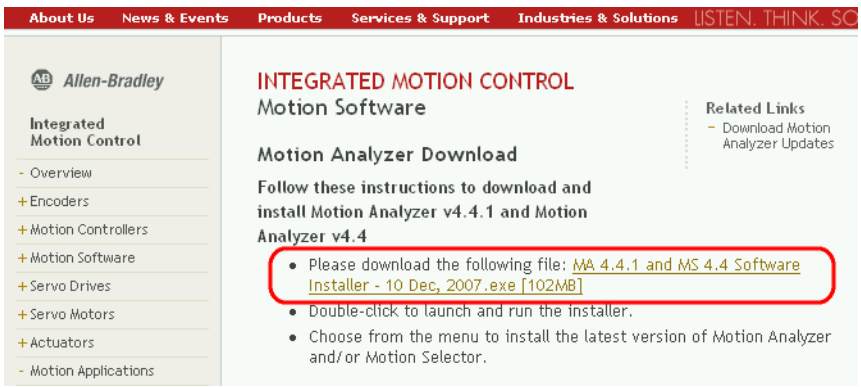

Configuration & Selection Tools
Product Selection
Overview
Get the Product Selection Toobox
System Configuration
Product Drawings
Integrated Architecture Tools
Get Support Now
Resources
Product Directory
Product Certification
Product Cross Reference
Literature Library
CONFIGURATION & SELECTION TOOLS
Rockwell Automation offers a powerful range of product selection and system configuration tools to assist you to choose and apply our products. There are tools available on-line and for you to install on your personal computer so that you can quickly access information on our products while in the office or on the go.
Product Selection
System Configuration
Product Drawings
Integrated Architecture Builder – Configure an Automation System
Motion Analyzer – Design a Motion Control System
Motion Analyzer uses sophisticated optimization tools to maximize ratios, inertia, and mechanical alternatives for motion control applications. [More Info | Download | Order]
CenterONE – Design a Low-Voltage Motor Control Center
MCS Star – Configure a Modular Motor Control System
Rail Builder – Design DIN Rail Systems

2. Select Motion Analyzer from the System Configuration tab.

3. Click Download.

   The Motion Analyzer webpage opens.

4. Click the Motion Analyzer software download link and follow the instructions provided.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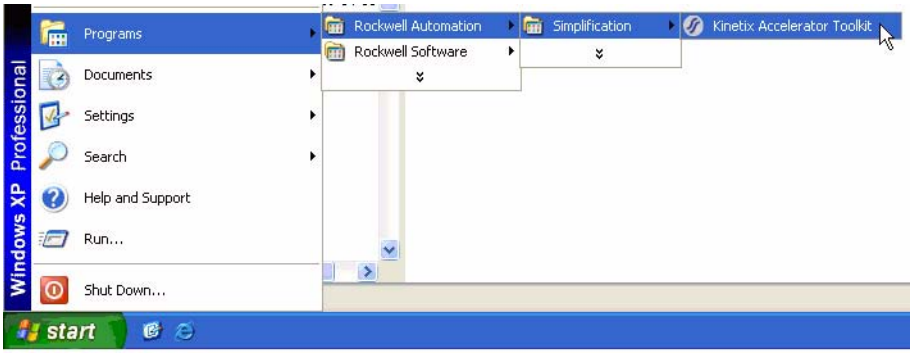
Motion Analyzer Download
Follow these instructions to download and install Motion Analyzer v4.4.1 and Motion Analyzer v4.4
Please download the following file: MA 4.4.1 and MS 4.4 Software Installer - 10 Dec, 2007.exe [102MB]
Double-click to launch and run the installer.
Choose from the menu to install the latest version of Motion Analyzer and/or Motion Selector.
Related Links
Download Motion Analyzer Updates

5. Use Motion Analyzer software to size your motor/drive combinations.

Install Motion Analyzer Software from the Kinetix Accelerator Toolkit CD

Follow these steps to install Motion Analyzer software from the CD.

1. From the Start menu, choose Programs>Rockwell Automation>Simplification>Kinetix Accelerator Toolkit.



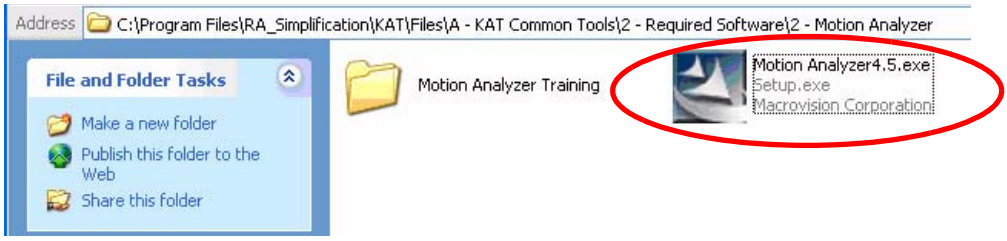
The Kinetix Accelerator Toolkit program starts.

2. From the toolkit menu, choose KAT Common Info>Required Program Software.

3. Open the 2 - Motion Analyzer folder.

Address
C:\Program Files\RA_Simplification\KAT\Files\A - KAT Common Tools\2 - Required Software
File and Folder Tasks
Make a new folder
Publish this folder to the Web
Share this folder
Other Places
1 - Ultraware
2 - Motion Analyzer
3 - RSNetWorx for DeviceNet
4 - Logix DeviceNet Tag Generator Tool

4. Double-click MotionAnalyzer 4.*x*.exe.

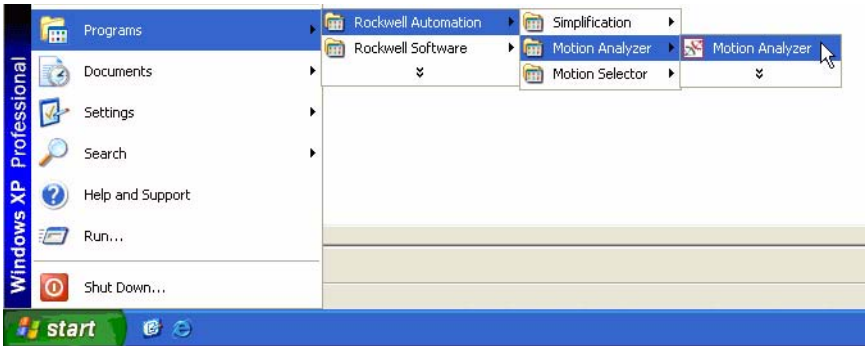


5. Follow the on-screen instructions to complete the program installation.

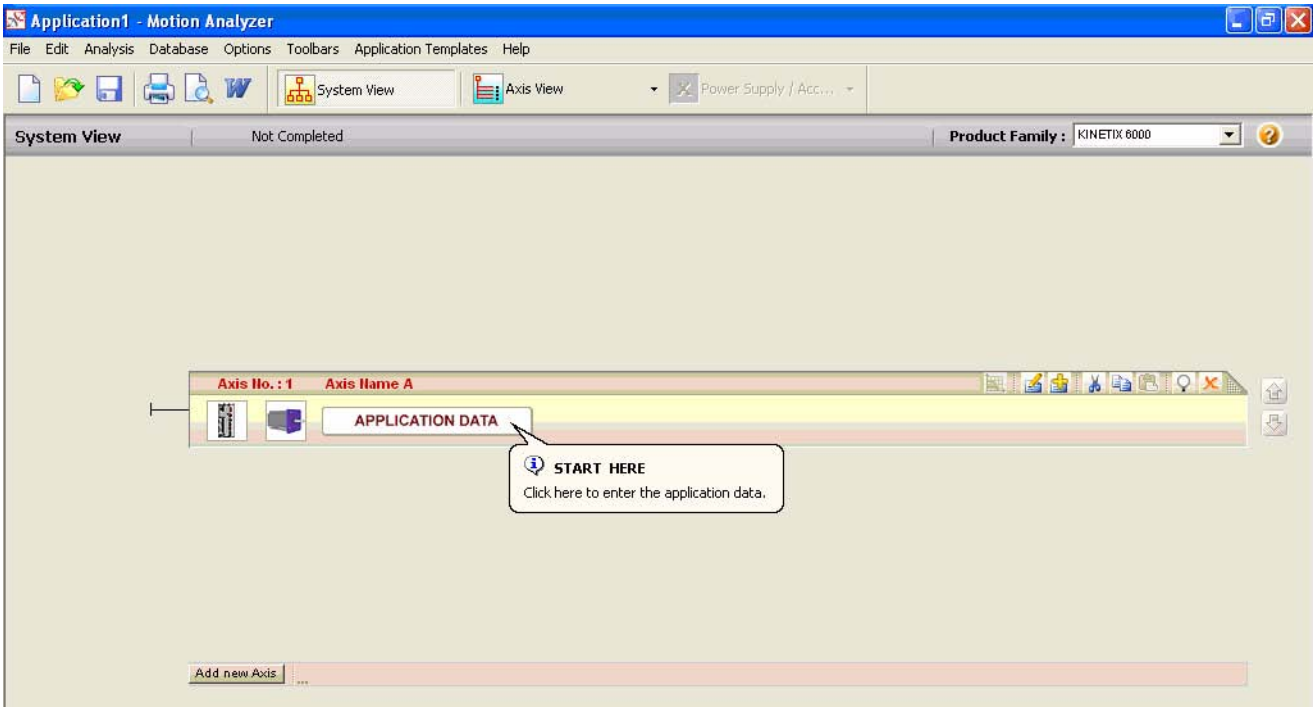
Open Motion Analyzer Software

Follow these steps to run the Motion Analyzer software.

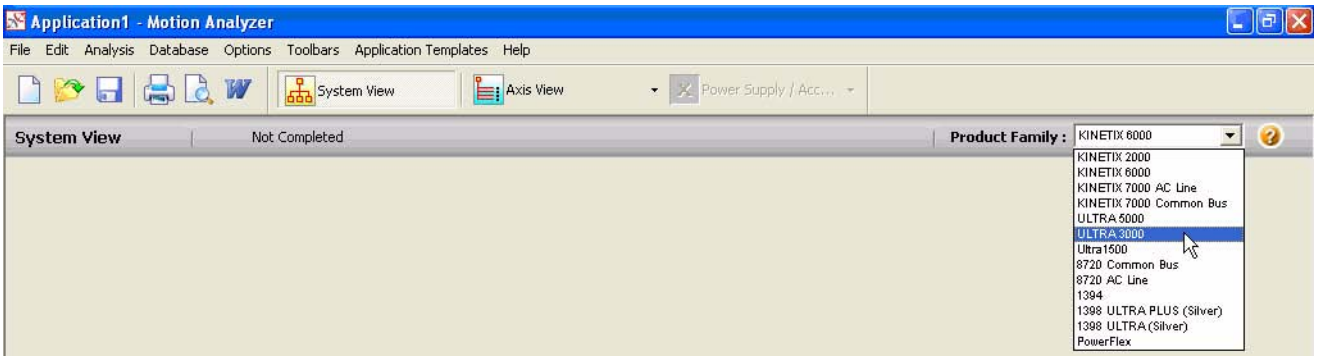
1. From the Start menu, choose Programs>Rockwell Automation>Motion Analyzer>Motion Analyzer.



The starting selection window opens.



2. Use the Product Family drop-down menu to select Ultra3000. (Kinetix 6000 is the default selection.)



3. Click Application Data.

4. Complete the system profile for your application.

TIP

For motor/drive performance specifications, refer to the Kinetix Motion Control Selection Guide, publication GMC-SG001.

For Motion Analyzer labs, refer to the Motion Analyzer Training Folder on the Kinetix Accelerator Toolkit CD, publication IASIMP-SP004. For a copy of the CD, contact your local Rockwell Automation distributor or sales representative.

Review Basic Panel Component Listings

The tables in this section include servo drives and motors, CompactLogix controller, PanelView Plus terminal (HMI), and accessory components for 400/460V and 200/230V systems. Review the basic component listings and compare with your specific application needs.

CompactLogix L31, 400/460V Base System

# Used	Components		Cat. No.	Description
1	Enclosure and panel (HxWxD, approx.)		Hoffman	1524 x 914 x 304 mm (60 x 36 x 12 in.)
			Rittal	
1	Input power	Line Interface Module (LIM)	2094-BL50S	460V, 50 A LIM module
1			140U-H-RVM12R	Through-the-door disconnect
1		Line Filter	2090-XXLF-X330B	3-phase, 30 A AC line filter
3	Ultra3000 Servo Drive System	Servo Drive	2098-DSD-HV030X-DN	3 kW output, indexing, DeviceNet communication option
3	Motors	MP-Series Low Inertia	MPL-B310P-MK22AA	0.77 kW output with absolute, multi-turn feedback
3	Cables	Motor Power	2090-XXNPMP-16S03	3 m (9.8 ft), MPL-B310P
3		Motor Feedback	2090-XXNFMP-S03	3 m (9.8 ft), MPL-B310P
1		HMI Communication	2711-NC13	5 m (16 ft), 9-pin to 9-pin
1		DeviceNet Media	1485C-P1A50	Trunk cable, round 50 m spool
3	Connector kit	Feedback	2090-UXBB-DM15	Connector kit for motor feedback
3	Connector kit	Control I/O	2090-U3BB2-DM44	Connector kit for control I/O signals
1	HMI	PanelView Plus	2711P-T6C5D	PanelView Plus 600, 24V DC, serial comms
1	Logix controller	CompactLogix with Serial Configuration	1769-L31	Controller, dual-serial comms, 512k memory
1			1769-IQ16	16-point 24V DC input module
1			1769-OB16	16-point 24V DC sourcing output module
1			1769-PB2	Power supply, 24V DC
1			1769-SDN	DeviceNet interface module
1			1769-ECR	End cap
1	Software	Controller Programming	9324-RLD200ENE	RSLogix 5000 Mini Edition
1		HMI Programming	9701-VWSTMENE	FactoryTalk View Studio Machine Edition
1		Drive Configuration	2098-UWCPRG	Ultraware Software

CompactLogix L31, 200/230V Base System

# Used	Components		Cat. No.	Description
1	Enclosure and panel (HxWxD, approx.)		Hoffman	1219 x 609 x 304 mm (48 x 24 x 12 in.)
			Rittal	
1	Input power	Line Interface Module (LIM)	2094-AL50S	230V, 50 A LIM module
1			140U-H-RVM12R	Through-the-door disconnect
1		Line Filter	2090-XXLF-X330B	3-phase, 30 A AC line filter
3	Ultra3000 Servo Drive	Servo Drive	2098-DSD-010X-DN	1 kW output, indexing, DeviceNet communication option
3	Motors	MP-Series Low Inertia	MPL-A310P-MK22AA	0.73 kW output with absolute, multi-turn feedback
3	Cables	Motor Power	2090-XXNPMP-16S03	3 m (9.8 ft), MPL-A310P
3		Motor Feedback	2090-XXNFMP-S03	3 m (9.8 ft), MPL-A310P
1		HMI Communication	2711-NC13	5 m (16 ft), 9-pin to 9-pin
1		DeviceNet Media	1485C-P1A50	Trunk cable, round 50 m spool
3	Connector kit	Feedback	2090-UXBB-DM15	Connector kit for motor feedback
3	Connector kit	Control I/O	2090-U3BB2-DM44	Connector kit for control I/O signals
1	HMI	PanelView Plus	2711P-T6C5D	PanelView Plus 600, 24V DC, serial comms
1	Logix controller	CompactLogix with Serial Configuration	1769-L31	Controller, dual-serial comms, 512k memory
1			1769-IQ16	16-point 24V DC input module
1			1769-OB16	16-point 24V DC sourcing output module
1			1769-PB2	Power supply, 24V DC
1			1769-SDN	DeviceNet interface module
1			1769-ECR	End cap
1	Software	Controller Programming	9324-RLD200ENE	RSLogix 5000 Mini Edition
1		HMI Programming	9701-VWSTMENE	FactoryTalk View Studio Machine Edition
1		Drive Configuration	2098-UWCPRG	Ultraware Software

CompactLogix L23E, 200/230V Base System

# Used	Components		Cat. No.	Description
1	Enclosure and panel (HxWxD, approx.)		Hoffman	1219 x 609 x 304 mm (48 x 24 x 12 in)
			Rittal	
1	Input power	Line Interface Module (LIM)	2094-AL50S	230V, 50 A LIM module
1			140U-H-RVM12R	Through-the-door disconnect
1		Line Filter	2090-XXLF-X330B	3-phase, 30 A AC line filter
1	Ultra3000 Servo Drive	Servo Drive	2098-DSD-010X-DN	1 kW output, indexing, DeviceNet communication option
1	Motors	MP-Series Low Inertia	MPL-A310P-MK22AA	0.73 kW output with absolute, multi-turn feedback
1	Cables	Motor Power	2090-XXNPMP-16S03	3 m (9.8 ft), MPL-A310P
1		Motor Feedback	2090-XXNFMP-S03	3 m (9.8 ft), MPL-A310P
1		HMI Communication	2711P-CBL-EX04	4 m (14 ft), Ethernet crossover
1		DeviceNet Media	1485C-P1A50	Trunk cable, round 50 m, spool
1	Connector kit	Feedback	2090-UXBB-DM15	Connector kit for motor feedback
1	Connector kit	Control I/O	2090-U3BB2-DM44	Connector kit for control I/O signals
1	HMI	PanelView Plus	2711P-T6C20D	PanelView Plus 600, 24V DC, Ethernet comms
1	Logix controller	CompactLogix with Serial Configuration	1769-L23E-QB1B	Controller, serial and Ethernet/IP comms, 512k memory, 16 DC in, 16 DC out, 24V DC power supply
1			1769-SDN	DeviceNet interface module
1	Software	Controller Programming	9324-RLD200ENE	RSLogix 5000 Mini Edition
1		HMI Programming	9701-VWSTMENE	FactoryTalk View Studio Machine Edition
1		Drive Configuration	2098-UWCPRG	Ultraware Software

Verify Base System Performance Specifications

This section provides system combination information for the Ultra3000 drives when matched with MP-Series low-inertia motors. Included are motor power, feedback, and brake cable catalog numbers, system performance specifications, and torque/speed curves. Refer to the Kinetix Motion Control Selection Guide, publication GMC-SG001, for additional motor/drive performance specifications.

Refer to the following table to determine the appropriate cables needed for your Ultra3000 drive and motor combination.

Ultra3000 Servo Drive	Motor Type	Motor Power Cable	Motor Feedback Cable	Motor Brake Cable
2098-DSD-HV030X-DN	MPL-B310P	2090-XXNPMF-16S*xx*	2090-XXNFMF-S*xx* (1) (2) Absolute High-resolution Feedback	2090-UXNBMP-18S*xx*
2098-DSD-010X-DN	MPL-A310P			

(1) Use connector kit (catalog number 2090-UXBB-D15M) or panel-mounted breakout components on drive end. Refer to the Kinetix Motion Control Selection Guide, publication GMC-SG001, for catalog numbers.

(2) Premolded (drive end) feedback cables (catalog number 2090-UXNFBMP-S*xx*) are also available for Ultra3000 drives.

Motor end connector kits are available for motor power, feedback, and brake cables. Refer to the Kinetix Motion Control Selection Guide, publication GMC-SG001, for catalog numbers.ttt Cable length *xx* is in meters.

400/460V System Performance Specifications

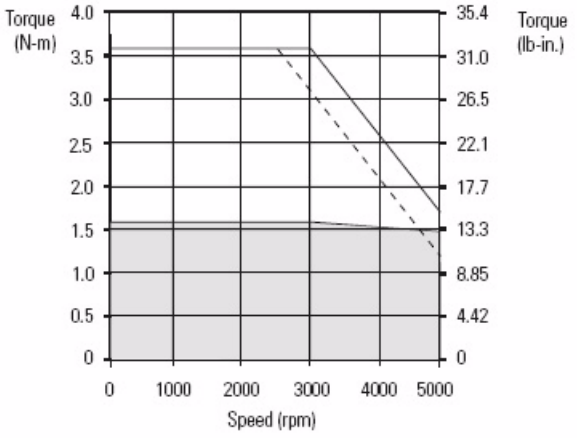
Motor	Max Speed rpm	System Continuous Stall Current A 0-pk	System Continuous Stall Torque N•m (in•lb)	System Peak Stall Current A 0-pk	System Peak Stall Torque N•m (in•lb)	Motor Rated Output kW	Ultra3000 460V Drives
MPL-B310P	5000	2.4	1.58 (14)	7.1	3.61 (32)	0.72	2098-DSD-HV030X-DN

200/230V System Performance Specifications

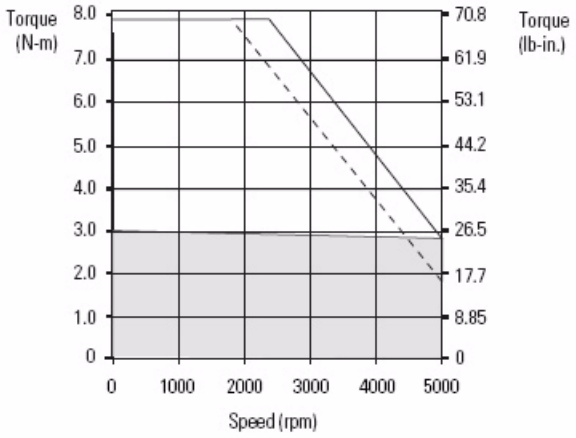
Motor	Max Speed rpm	System Continuous Stall Current A 0-pk	System Continuous Stall Torque N•m (in•lb)	System Peak Stall Current A 0-pk	System Peak Stall Torque N•m (in•lb)	Motor Rated Output kW	Ultra3000 230V Drives
MPL-A310P	5000	4.85	1.58 (14)	14	3.61 (32)	0.73	2098-DSD-010X-DN

Ultra3000 Drives/MP-Series Low Inertia Motor Curves

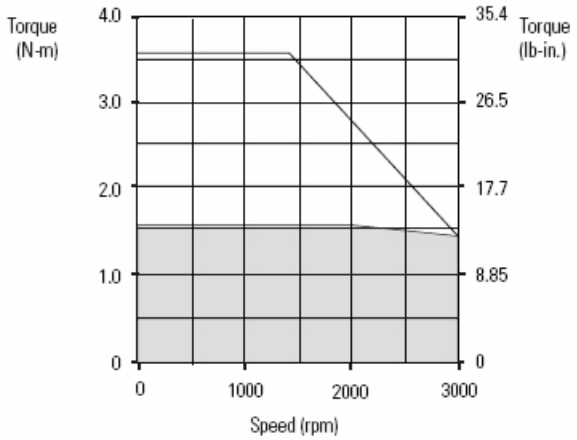
2098-*xxx*-HV030 and MPL-B310P



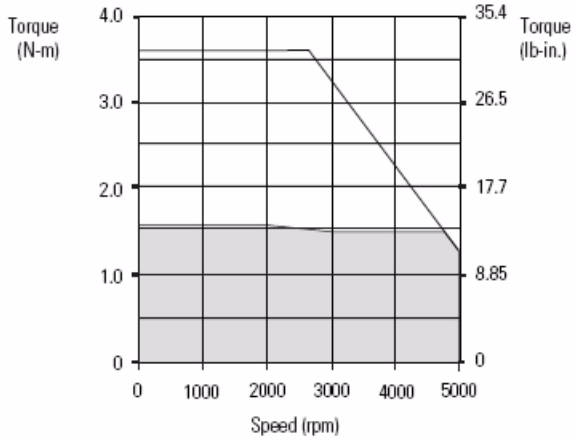
2098-*xxx*-HV030 and MPL-B320P



2098-*xxx*-010 and MPL-A310F



2098-*xxx*-010 and MPL-A310P



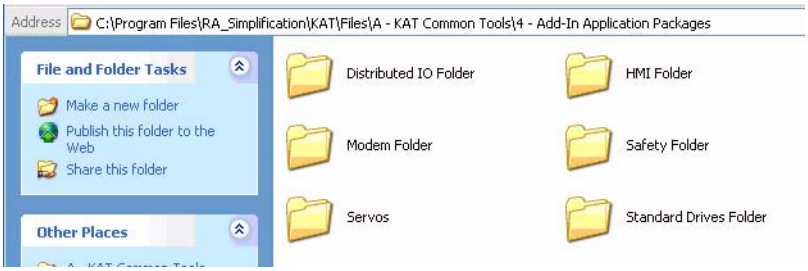
= Intermittent operating region
= Continuous operating region
– – – = Drive operation with 400V ac (rms) input voltage

Select Add-In Components

Follow these steps to add components to your base system.

1. From the toolkit menu, choose KAT Common Info>Add-In Application Packages.

2. Identify additional components listed in the Add-In Application Packages folder that you would like to add to your system.



3. If necessary, identify additional components not listed in the Add-In Application Packages folder. Contact your local Allen-Bradley representative for more information.

Plan System Layout

In this chapter, you layout the system components selected in Chapter 2. Use the CAD drawings supplied on the Kinetix Accelerator Toolkit CD, publication IASIMP-SP004, to add or remove components to and from the basic motion control panel system. For a copy of the CD, contact your local Rockwell Automation distributor or sales representative.

Before You Begin

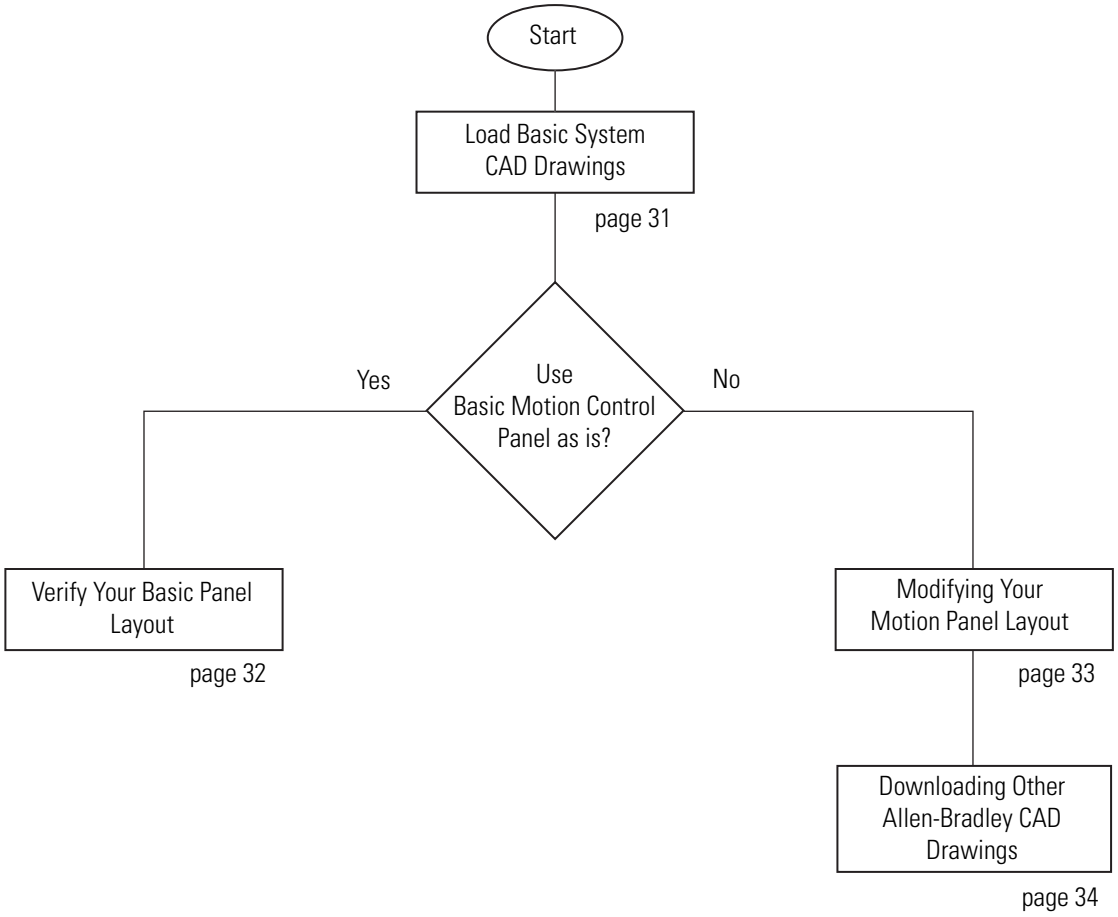
- Complete the Kinetix Accelerator Toolkit CD installation. (Refer to Chapter 1.)
- Complete your system hardware selection. (Refer to Chapter 2.)

What You Need

- Kinetix Accelerator Toolkit CD, publication IASIMP-SP004
- System Design for Control of Electrical Noise Reference Manual, publication GMC-RM001
- System Design for Control of Electrical Noise Video, publication GMC-SP004
- Ultra3000 Digital Servo Drive Installation Manual, publication 2098-IN003
- Ultra3000 Digital Servo Drive with DeviceNet Reference Manual, publication 2098-RM004

Follow These Steps

Complete the following steps to plan your system layout within the enclosure.



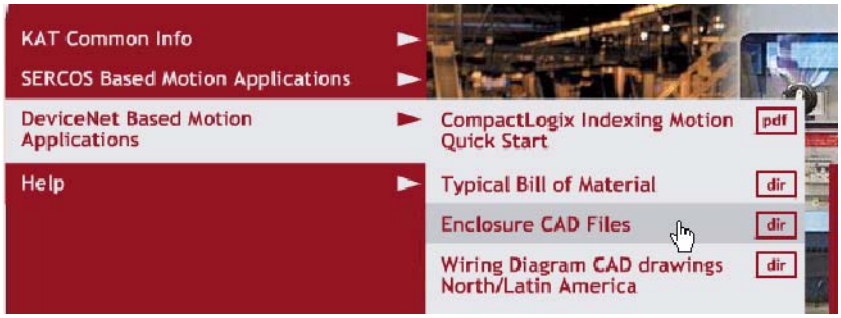
Load Basic System CAD Drawings

The Kinetix Accelerator Toolkit CD provides CAD drawings, in DXF format, to assist in planning the layout of your system. The drawings are designed to optimize panel space and to minimize electrical noise.

Follow these steps to locate the CAD files from the Kinetix Accelerator Toolkit CD.

1. Open the Kinetix Accelerator Toolkit program. From the Start menu, choose Programs>Rockwell Automation>Simplification>Kinetix Accelerator Toolkit.

2. From the Toolkit menu, choose DeviceNet Based Motion Applications>Enclosure CAD Files.



3. Use your CAD program to open these and other enclosure CAD files:

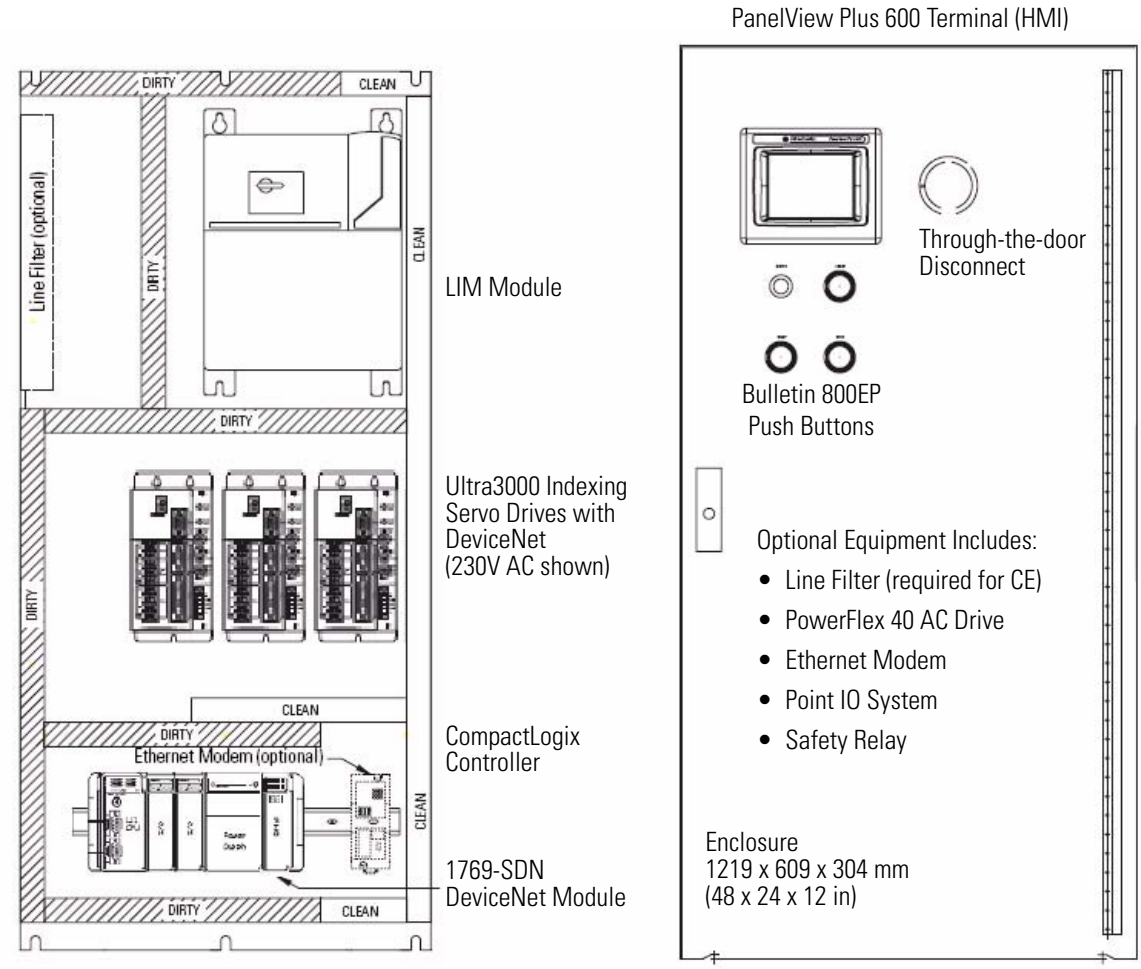
   - CIMAT_L23_230_PANEL_LAYOUT.dwg
   - CIMAT_L31_460_PANEL_LAYOUT.dwg

4. Identify additional layout needs specific to your application.

Verify Your Basic Panel Layout

The basic motion control panel layout is shown below. Included is a three-axis Ultra3000 drive system with Line Interface Module (LIM), PanelView Plus 600 terminal, and CompactLogix controller with DeviceNet interface module. Verify that your system matches this diagram. If it does not match, follow the instructions in Modifying Your Motion Panel Layout on page 33.

Sample Information from Enclosure Files



IMPORTANT The enclosure CAD drawings were designed using best-practices techniques as shown in the System Design for Control of Electrical Noise Reference Manual, publication GMC-RM001. Refer to this publication when making modifications to the basic motion control panel layout.

Refer to the Ultra3000 Digital Servo Drives Installation Manual, publication 2098-IN003, for panel layout instructions specific to the Ultra3000 drives.

Modifying Your Motion Panel Layout

Follow the steps in this section if you do **not** use the basic motion control panel as is and want to modify your motion panel layout.

1. From the basic motion control panel CAD drawing, remove the equipment you do not need for your application.

2. Open the CAD drawings of optional equipment you would like to add to your system. From the Toolkit menu, choose KAT Common Info>Add-In Application Packages.

3. Copy and paste objects from the optional equipment CAD drawings to the basic motion control panel drawing.

4. Select other hardware as needed.

   Refer to Downloading Other Allen-Bradley CAD Drawings on page 34. Refer to the Literature Library (http://literature.rockwellautomation.com) for access to publications.

5. Determine if your duty cycle and selected components require additional cooling.

   Refer to Enclosure Selection in the Ultra3000 Digital Servo Drive Installation Manual, publication 2098-IN003, for an enclosure sizing example.

Downloading Other Allen-Bradley CAD Drawings

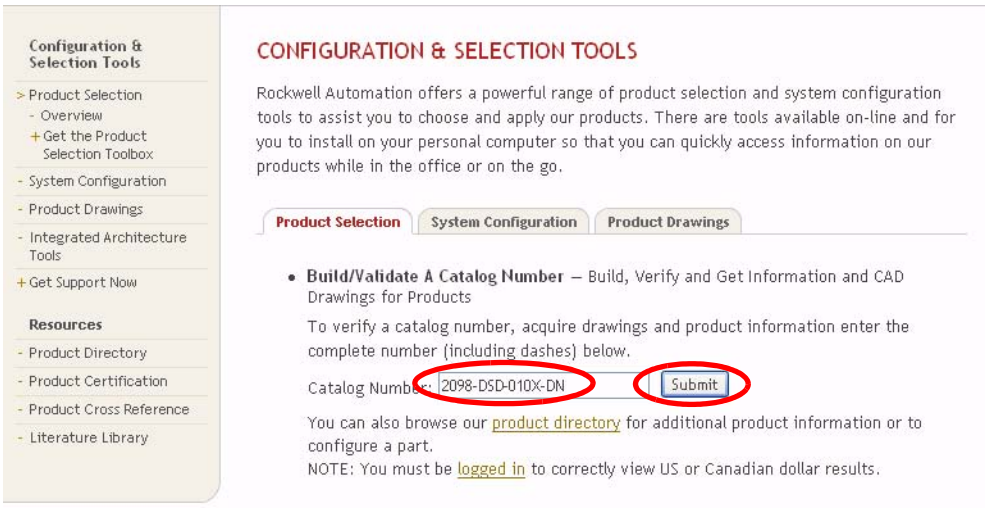
Follow these steps if you want to download other Allen-Bradley product CAD drawings.

1. Open your browser and go to http://ab.com/e-tools.

   The Configuration and Selection Tools webpage opens.

2. Enter the Catalog Number of the product.

3. Click Submit.


Configuration & Selection Tools
> Product Selection
- Overview
+ Get the Product Selection Toolbox
- System Configuration
- Product Drawings
- Integrated Architecture Tools
+ Get Support Now
Resources
- Product Directory
- Product Certification
- Product Cross Reference
- Literature Library
CONFIGURATION & SELECTION TOOLS
Rockwell Automation offers a powerful range of product selection and system configuration tools to assist you to choose and apply our products. There are tools available on-line and for you to install on your personal computer so that you can quickly access information on our products while in the office or on the go.
Product Selection
System Configuration
Product Drawings
Build/Validate A Catalog Number – Build, Verify and Get Information and CAD Drawings for Products
To verify a catalog number, acquire drawings and product information enter the complete number (including dashes) below.
Catalog Number: 2098-DSD-010X-DN
Submit
You can also browse our product directory for additional product information or to configure a part.
NOTE: You must be logged in to correctly view US or Canadian dollar results.

   The Configuration Results dialog opens.

4. Click DXF, AutoCad Drawing 2-D.

5. Download and save the file.

Plan System Wiring

In this chapter, you plan the cable layout for your system components placed in Chapter 3. Use the CAD drawings supplied with the Kinetix Accelerator Toolkit CD to assist in the routing of wires and cables for your system components. For a copy of the CD, contact your Rockwell Automation distributor or sales representative.

Before You Begin

- Complete the Kinetix Accelerator Toolkit CD installation. (Refer to Chapter 1.)
- Complete your system hardware selection. (Refer to Chapter 2.)
- Complete your system layout. (Refer to Chapter 3.)

What You Need

- Kinetix Accelerator Toolkit CD, publication IASIMP-SP004
- CAD files typical of those included on the Kinetix Accelerator Toolkit CD:

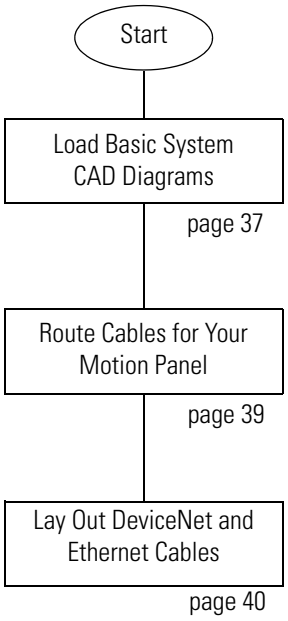
CAD file name	Description
CIMAT_L*xx_xxx*_PANEL_LAYOUT.dwg	Base CompactLogix System Enclosure and 230V AC or 460V AC Drive Layout and Diagram
CIMAT_L*xx_xxx*_1_POWER_DISTRIBUTION.dwg	Power Distribution Connection Diagram for 230V AC or 460V AC Systems
CIMAT_L*xx_xxx* _2_CONTROL_POWER.dwg	120V AC and 24V DC Power Distribution
CIMAT_L*xx_xxx* _3_LIM_DISTRIBUTION.dwg	Line Interface Module Connections
CIMAT_L*xx_xxx* _4_DRIVE1_IO.dwg	Ultra3000 I/O Connections for CN1 - Drive 1
CIMAT_L*xx_xxx* _5_DRIVE2_IO.dwg	Ultra3000 I/O Connections for CN1 - Drive 2
CIMAT_L*xx_xxx* _6_DRIVE3_IO.dwg	Ultra3000 I/O Connections for CN1 - Drive 3
CIMAT_L*xx_xxx* _7_NETWORK_CONNECTIONS.dwg	DeviceNet Network Communication and Power Supply Connections
CIMAT_L*xx_xxx* _8_PLC_IO.dwg	1769-IQ16, 16-Point, Sink/Source, 24V DC Input Wiring Diagram and 1769-OB16, 16-Point, Sourcing, 24V DC Output Wiring Diagram
CIMAT_L*xx_xxx* _9_TERMINAL_DETAIL.dwg	Terminal Blocks within Enclosure
CIMAT_L*xx_xxx* _10_CONNECTOR_DETAIL_CN1.dwg	Ultra3000 Drive I/O Connector Detail for 230V AC and 460V AC Drives
CIMAT_L*xx_xxx* _11_CONNECTOR_DETAIL_CN2.dwg	Ultra3000 Drive Feedback Connector Detail

- Ultra3000 Digital Servo Drive Installation Manual, publication 2098-IN003
- Line Interface Module Installation Instructions, publication 2094-IN005
- System Design for Control of Electrical Noise, publication GMC-RM001
- System Design for Control of Electrical Noise Video, publication GMC-SP004
- Documentation that came with your other Allen-Bradley products

  Refer to the Literature Library (http://literature.rockwellautomation.com) for access to publications.

Follow These Steps

Complete the following steps to plan the installation and wiring of your system components within the enclosure.



Load Basic System CAD Diagrams

The Kinetix Accelerator Toolkit CD, publication IASIMP-SP004, provides CAD diagrams, in DWG format, to assist in planning your system wiring. The diagrams are designed to optimize panel space and to minimize electrical noise.

Follow these steps to locate the CAD files for the Kinetix Accelerator Toolkit CD.

1. Open the Kinetix Accelerator Toolkit program. From the Start menu, choose Programs>Rockwell Automation>Simplification>Kinetix Accelerator Toolkit.

2. From the toolkit menu, choose DeviceNet Based Motion Applications>Enclosure CAD Files.

3. Use your CAD program to open these and other enclosure CAD files.

   - CIMAT_L23_230_PANEL_LAYOUT.dwg
   - CIMAT_L31_460_PANEL_LAYOUT.dwg

4. From the Toolkit menu, choose DeviceNet Based Motion Applications>Wiring Diagram CAD Drawings North/Latin America.

5. Use your CAD program to open these and other wiring diagram CAD files.

- CIMAT_L*xx_xxx*_1_POWER_DISTRIBUTION.dwg
- CIMAT_L*xx_xxx*_2_CONTROL_POWER.dwg
- CIMAT_L*xx_xxx*_3_LIM_DISTRIBUTION.dwg
- CIMAT_L*xx_xxx*_4_DRIVE1_IO.dwg
- CIMAT_L*xx_xxx*_5_DRIVE2_IO.dwg
- CIMAT_L*xx_xxx*_6_DRIVE3_IO.dwg
- CIMAT_L*xx_xxx*_7_NETWORK_CONNECTIONS.dwg
- CIMAT_L*xx_xxx*_8_PLC_IO.dwg
- CIMAT_L*xx_xxx*_9_TERMINAL_DETAIL.dwg
- CIMAT_L*xx_xxx*_10_CONNECTOR_DETAIL_CN1.dwg
- CIMAT_L*xx_xxx*_11_CONNECTOR_DETAIL_CN2.dwg

TIP The term 'CIMAT' refers to the CompactLogix Indexing Motion Accelerator Toolkit.

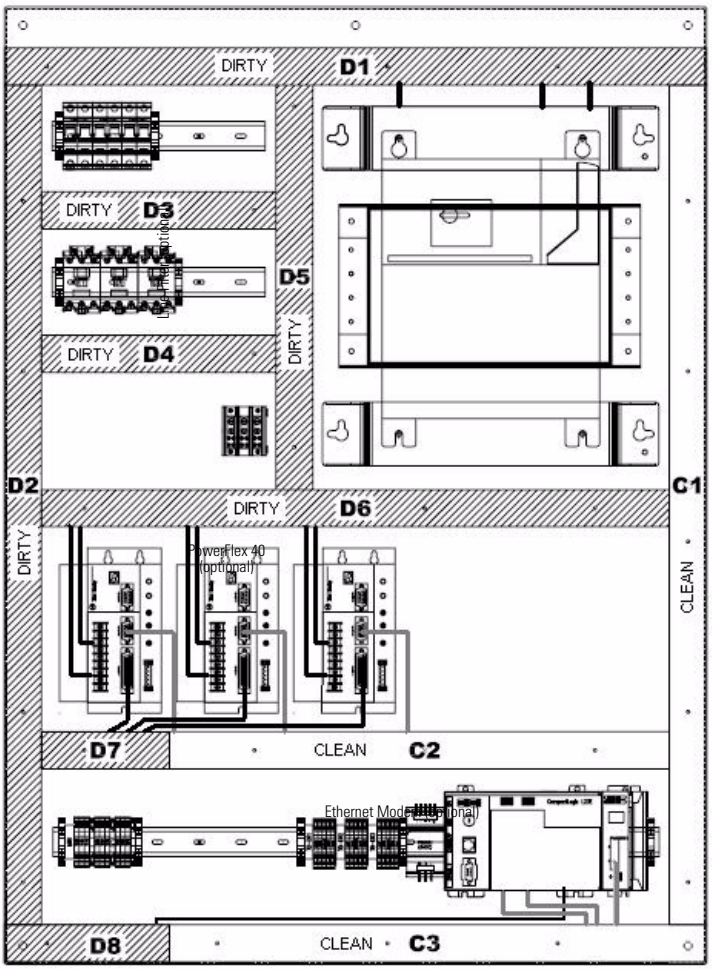
6. Identify additional wiring needs specific to your application.

Route Cables for Your Motion Panel

The base system enclosure diagrams for the three-axis motion control panel, including noise zones, is shown below. The enclosure CAD drawings are provided as examples of best-practices techniques used to minimize electrical noise, as covered in the System Design for Control of Electrical Noise Reference Manual, publication GMC-RM001.

The enclosure diagram provides designators that coordinate with the wiring diagrams, illustrating where to route your power and I/O cables.

Sample Information from Enclosure Files



Noise Zone Legend

CLEAN wireway for noise-sensitive device circuits.

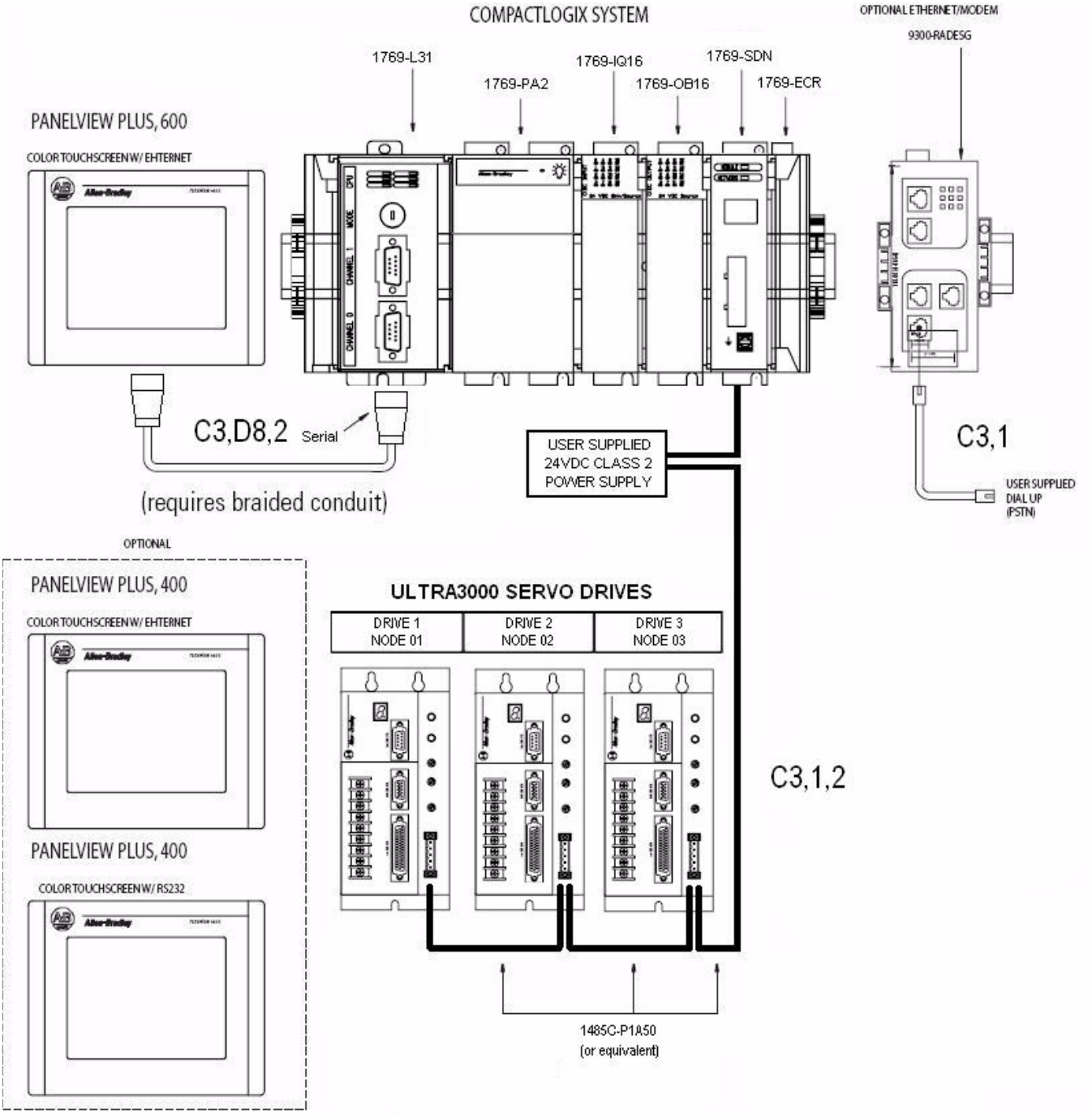
DIRTY wireway for noise-generating device circuits.

IMPORTANT Refer to the Ultra3000 Digital Servo Drives Installation Manual, publication 2098-IN003, for installation and wiring instructions specific to the Ultra3000 drives. For other equipment shown in your CAD drawings, refer to the installation instructions that came with those products.

Lay Out DeviceNet and Ethernet Cables

A sample DeviceNet and Ethernet cable diagram is shown below. The diagram provides designators that coordinate with the panel layout diagram, indicating where to route your DeviceNet and Ethernet cables.

Sample Cable Diagram



Motion Logix Integration

In this chapter, you configure your servo drives, your DeviceNet network, and your RSLogix 5000 application file. Logix application files (.acd) are included in the Controller Program Files folder on the Kinetix Accelerator Toolkit CD.

You can choose a:

- 1-axis pre-configured CompactLogix L2*x* file.
- 1-, 2-, 3-axis pre-configured CompactLogix L3*x* file.

After file selection, you configure the CompactLogix modules and drives, add axes if needed, and download the program. Refer to Logix programming manuals for additional device configuration and programming requirements.

Before You Begin

- Complete the Kinetix Accelerator Toolkit CD installation. (Refer to Chapter 1.)
- Complete your system hardware selection. (Refer to Chapter 2.)
- Complete your system layout. (Refer to Chapter 3.)
- Complete your system wiring. (Refer to Chapter 4.)

What You Need

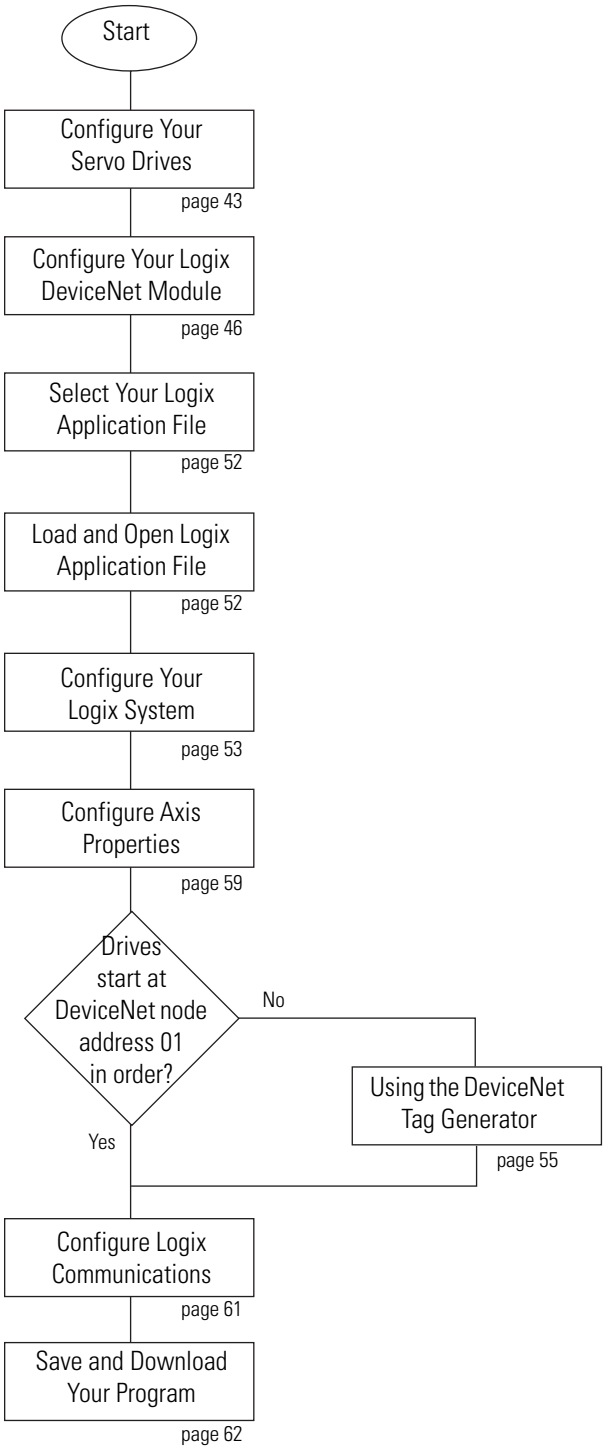
- Kinetix Accelerator Toolkit CD, publication IASIMP-SP004
- RSLogix 5000 software, version 17.0 or later
- RSLinx Classic software, version 2.54 or later
- Logix application file: CIML*xx*_*x*axis_v00*x*.acd

  Logix files are available on the Kinetix Accelerator Toolkit CD. For a copy of the CD, contact your local Rockwell Automation distributor or sales representative.

- Ultra3000 Digital Servo Drive Installation Manual, publication 2098-IN003
- Ultra 3000 Digital Servo Drive with DeviceNet Reference Manual, publication 2098-RM004
- DeviceNet Modules in Logix5000 Control Systems User Manual, publication DNET-UM004

Follow These Steps

Complete the following steps to configure your CompactLogix Indexing Motion application.



Configure Your Servo Drives

Follow these steps to configure your Servo Drives.

IMPORTANT Before applying power to the Ultra3000 servo drive, you must set the node addresses for the DeviceNet network. If you have already applied power to the drive, you must cycle power after changing the network settings.

1. Use the rotary switches on the front of the Ultra3000 servo drive (labeled MSD and LSD) to set the desired DeviceNet node address. Keep the addresses below 7 (use 01…06) if possible.

TIP Keeping the addresses below 7 allows you to use RSNetWorx for DeviceNet, the DeviceNet configuration software in demo mode. Demo mode does not require the software to be purchased, but limits functionality to addresses under 7. Contact your Rockwell Automation representative if addresses above 00…06 are required.

Each DeviceNet device must have a unique address.

To set your address to 01, set the MSD (most significant digit) to 0 and the least LSD (least significant digit) to 1. Notice the line that runs down one side of the rotary switch, indicating your choice.

2. Make sure that the drive is not enabled (terminal 31 on the CN1 connector) and apply power to the drive at this point.

3. Connect the serial programming cable (catalog number 2090-UXPC-D09*xx*) between your workstation and the Ultra3000 servo drive.

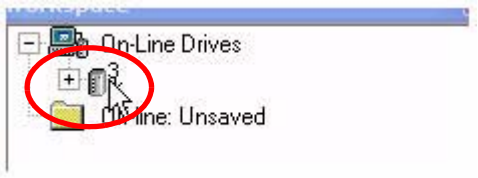
4. Open Ultraware programming software using the Start menu or the desktop shortcut.

5. Select Create new file.

6. Click OK.

Ultraware will attach to the servo drive.

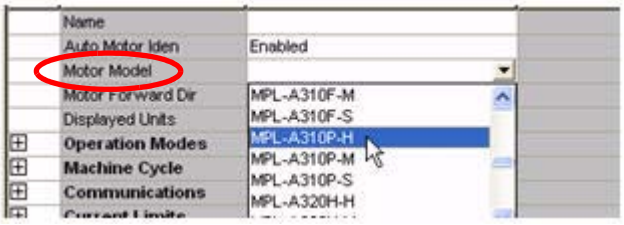
7. Double-click the drive symbol in the On-Line section to view its current settings.



You may wish to click Reset EEPROM to Factory Settings if you are not sure what parameters have been previously changed in the drive.

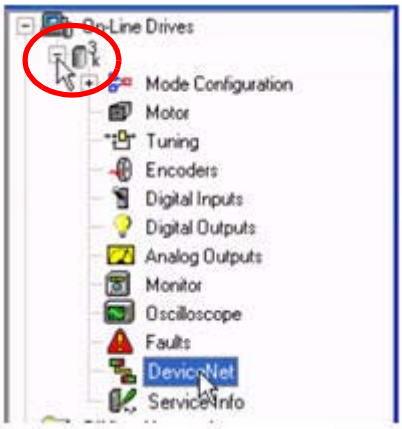
IMPORTANT Verify that you removed the 'Enable' input in the steps above. The drive may enable and run if the Enable signal is present.

8. Carefully use the pull-down menu to select the proper Motor Model from the list.

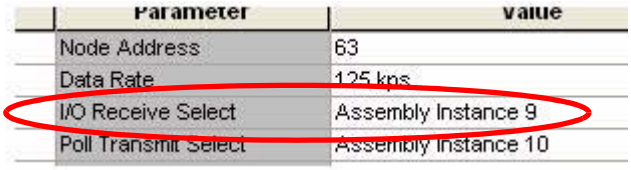


9. Expand the drive's Explorer window by clicking the '+' sign next to the drive symbol.

10. Double-click the DeviceNet folder.



11. Select Assembly Instance 9 for the I/O Receive Select entry.

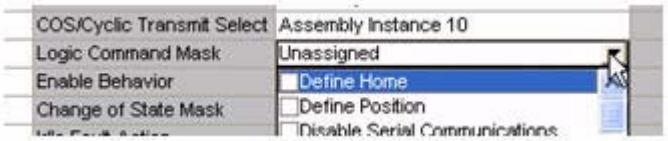


12. Set the Poll Transmit Select to Assembly Instance 12.

13. Verify that the COS/Cyclic Transmit Select is set to Assembly Instance 10.

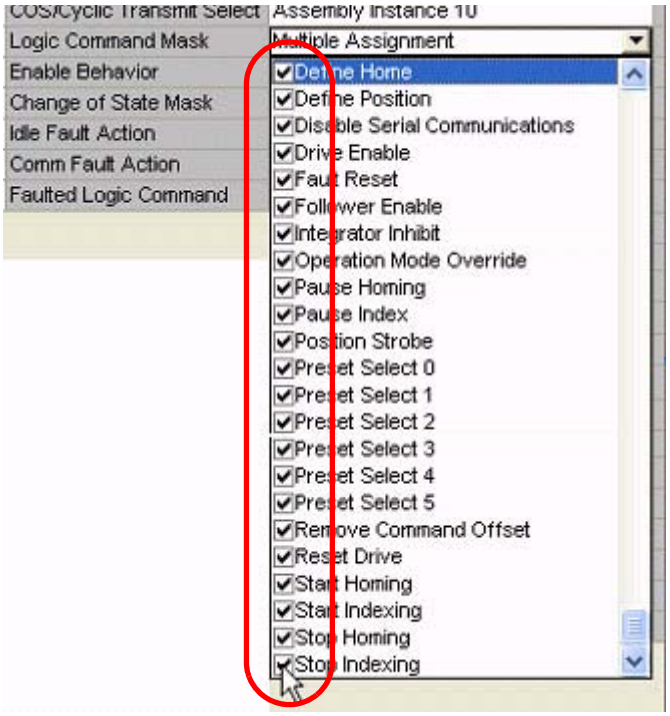
These settings allow us to get the most data and diagnostics out of the drive.

14. For the Logic Command Mask, click the down arrow to view the pull-down list.

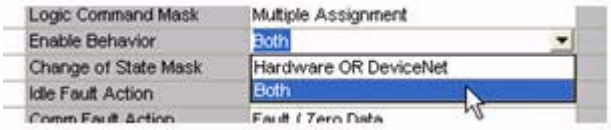


15. Check **all** the boxes all the way down to the bottom. Use the scroll bar on the right to reach them all.

Checking these boxes gives access to all the commands to the drive over the DeviceNet network. This eliminates the need for additional I/O wiring, drive configuration, and PLC programming.



16. Change the Enable Behavior selection to Both.



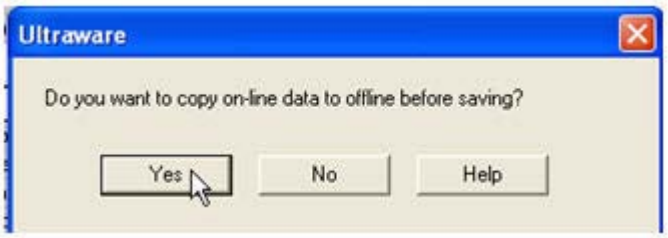
This requires us to provide a 24V DC 'drive enable' input to the drive (on terminal 31 of the CN1 connector) but also allows us to command the drive to enable/disable from the CompactLogix controller over the DeviceNet network.

17. (Optional) You may choose to tune your servo axis at this point.

IMPORTANT To reduce the possibility of unpredictable motor response, disconnect all loads from your motors until initial axis tuning is complete. For tuning procedure, refer to the Ultra3000 Digital Servo Drive Installation Manual, publication 2098-IN003.

18. Save your drive setup file.

19. Click 'Yes' to the prompt to copy the on-line values from the drive.



20. Exit Ultraware.

IMPORTANT Repeat all steps in this section for additional Ultra3000 servo drives.

Configure Your Logix DeviceNet Module

Follow these steps to configure your Logix DeviceNet module.

Commission an Out-of-Box DeviceNet Module

IMPORTANT This section is for commissioning an out-of-box DeviceNet scanner module. You do not need to perform the steps in this section if your scanner is already configured.

1. Be sure that all of your CompactLogix controller modules (processor, I/O modules, scanner, and power supplies) are properly seated on the DIN rail and that the bus interconnect is properly slid over to the previous module and seated.
2. Apply power to the CompactLogix power supply and wait for the components to power up.
3. Connect your workstation to the CompactLogix controller.
   - If you are using a serial connection, make sure that you have connected the 1756-CP3 (or similar) cable between your workstation and one of the 9-pin serial ports on the controller.
   - If you are using an Ethernet connection, make sure that you have connected a twisted-pair cable between your workstation and the controller's RJ45 connection.
4. Create a communication driver in RSLinx Classic software. If needed, refer to the CompactLogix System Quick Start Manual, publication IASIMP-QS001.
5. Open the DeviceNet Node Commissioning Tool by choosing Start>Programs>Rockwell Software>RSNetWorx>DeviceNet Node Commissioning Tool.

6. Click Browse to begin browsing to your DeviceNet module.

Node Commissioning
Select a device by using the browsing service
Browse...
Current Settings
Address:
Data Rate:
New Setting
The network data rate should not be changed on an active network. The new network data rate will not take effect until power is recycled.

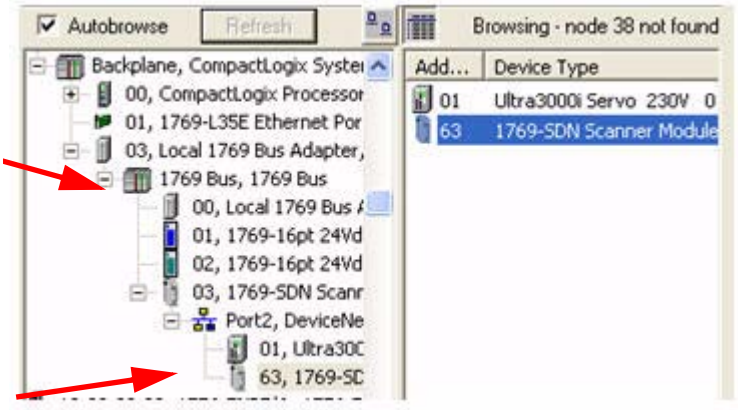
7. Select the appropriate RSLinx Classic driver and browse to your controller.

8. Under Backplane, expand the Local 1769 Bus Adapter and the 1769 Bus.

9. Expand the 1769-SDN scanner module.

10. Expand Port2 until you see the available DeviceNet nodes.

11. Highlight Node 63, the DeviceNet module.

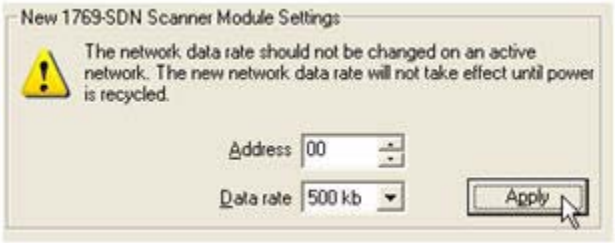


12. Click OK (not shown) located at the top right of the window.

13. Click Yes for any additional prompts.

14. After the scanner's Module Settings appear, change the Address to '00' and select the desired network Data rate.

15. Click Apply.

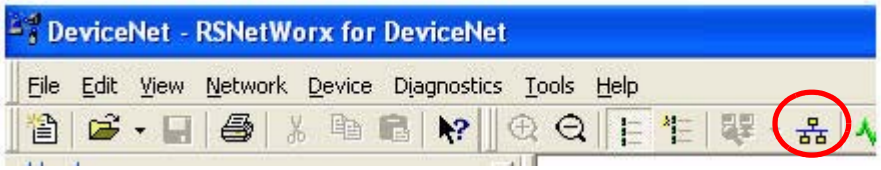

New 1769-SDN Scanner Module Settings
The network data rate should not be changed on an active network. The new network data rate will not take effect until power is recycled.
Address 00
Data rate 500 kb
Apply

16. After you receive confirmation of the changes, click Close.

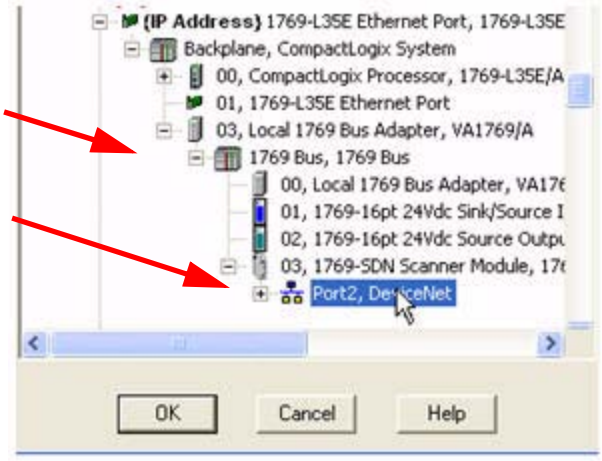
Configure the DeviceNet Module

1. Open RSNetWorx for DeviceNet programming software using the Start menu or the desktop shortcut.

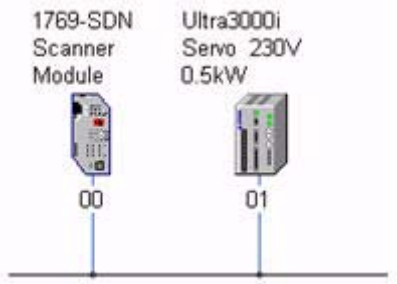
2. When the software opens, click the Online button to go online to your network.



3. Browse to your controller.
4. Under Backplane, expand the Local 1769 Bus Adapter and the 1769 Bus.
5. Under the 1769-SDN, highlight Port2.
6. Click OK to go online.



7. Click OK again to begin searching for all available network nodes.
8. Click Cancel after all available nodes have been identified. You don't have to wait for it to search for nodes you don't have in your system.
9. Your network should look similar to this.



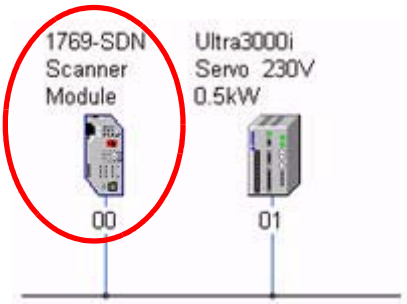
This reflects a single-axis system. Refer to the information in Additional Information for Single and Multi-Axis Systems on page 50 for using additional axes and for more detailed information.

10. Right-click Ultra3000 and select Upload from Device to upload existing parameters for the Ultra3000 servo drive.

    Since there are over 1000 parameters in the drive, this takes a while.

11. Repeat step 10 to upload parameters for all additional Ultra3000 drives.

12. Double-click the 1769-SDN scanner module to begin configuring the DeviceNet module.

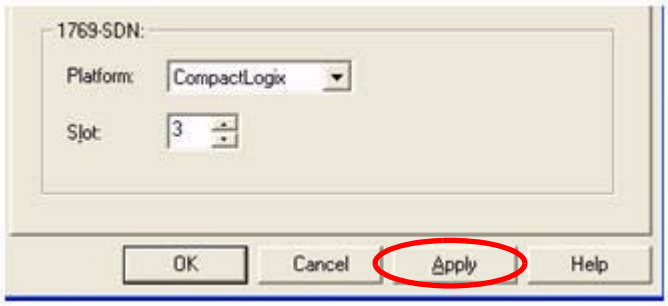


13. Click the Module tab and select Download if prompted.

This erases any settings in the scanner if it was ever previously used.

14. Set the 1769-SDN scanner module settings at the bottom of the dialog box as appropriate for your system.

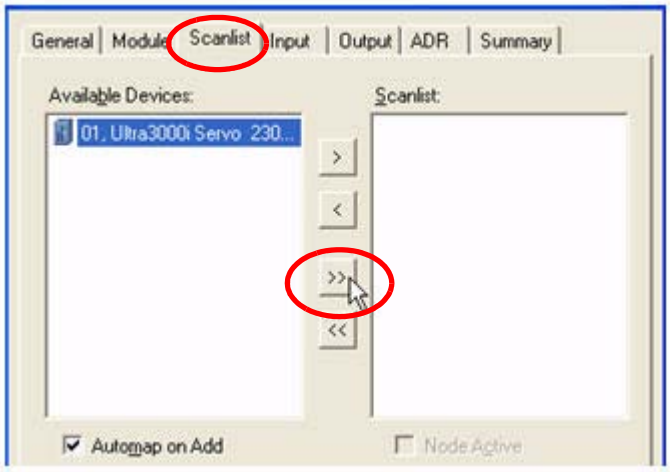
15. Click Apply.



16. Click the Scanlist tab.

17. Automap all available devices into the scanner by using the >> button.

This allows the controller to connect to the devices and control the servo drives.



18. Verify that the DeviceNet scanner is in IDLE mode and not in RUN mode.

19. Click OK and click Yes to confirm downloading these changes to the scanner.

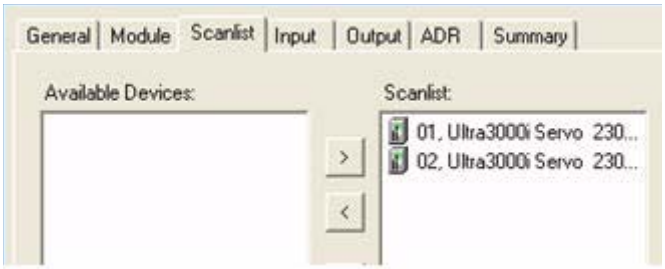
20. Save your work.

21. Exit RSNetworx for DeviceNet software.

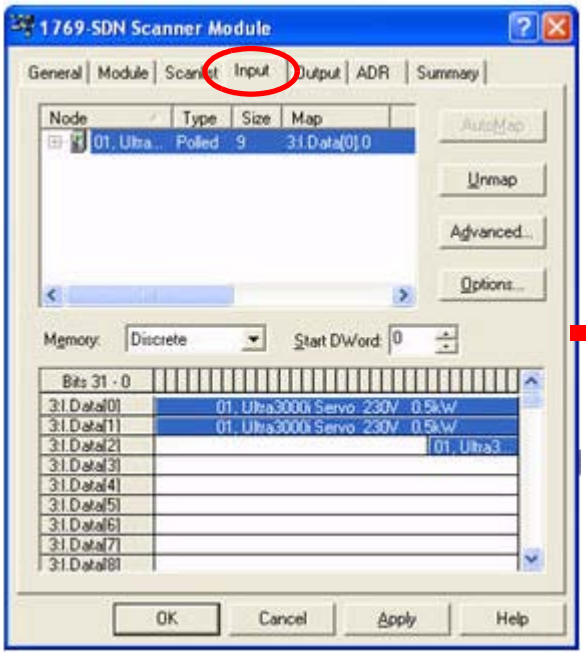
Additional Information for Single and Multi-Axis Systems

The following information about DeviceNet is for reference only. No action is required. However, if you do map additional axes, be sure to close RSNetWorx for DeviceNet software before proceeding.

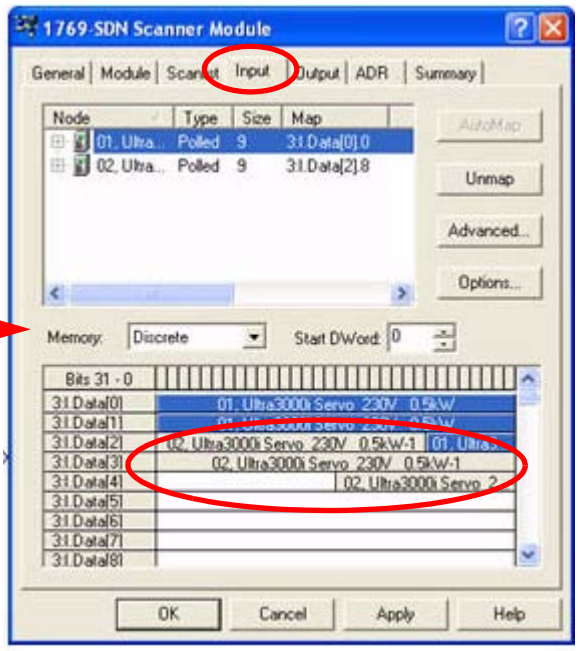
Additional axes (drives) can be automapped as shown in step 17 into the DeviceNet module's Scanlist.



The Input tabs look similar, but contain more data.

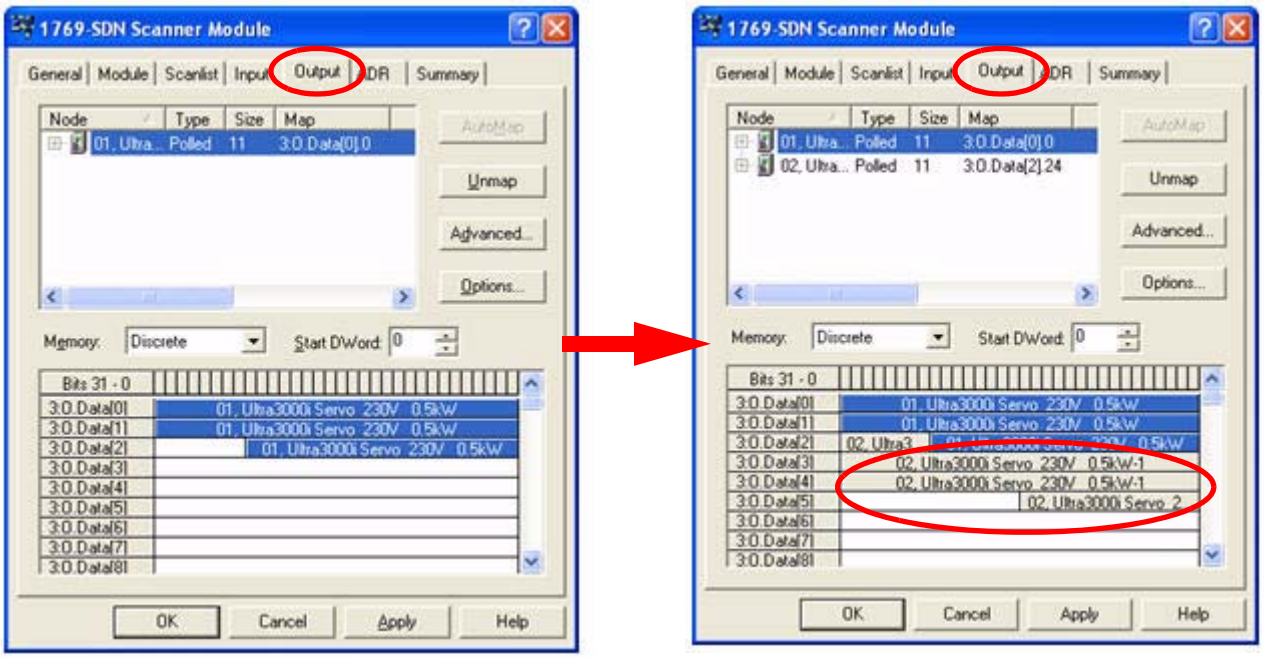


Single-Axis System



Double-Axis System

The Output tabs also look similar, but contain more data.



Single-Axis System

Double-Axis System

Notice that no custom data mapping is required of the data. Even though the words of data overlap and multiple drives share the same word boundary, this is handled by the Logix application code provided on the toolkit with no manual action required.

TIP The limiting factor for how many drives can be used is based on the module's available memory (90 words for the 1769-SDN scanner module) and how much data your devices are configured to require (2.75 words here). This example would mathematically lead to answer of about 30 drives, but the network performance would have to be considered before using 30 drives.

Be sure to close RSNetWorx for DeviceNet software before proceeding.

Select Your Logix Application File

Choose the correct file for your system.

Logix Platform	Logix File Name	Description
CompactLogix L2*x*	CIML2*x*_1axis_v00*x*.acd	CompactLogix L2*x* file pre-configured for single-axis Ultra3000 drive system.
CompactLogix L3*x* File for Axis Count	CIML3*x*_1axis_v00*x*.acd	CompactLogix L3*x* file pre-configured for single-axis Ultra3000 drive system.
	CIML3*x*_2axis_v00*x*.acd	CompactLogix L3*x* file pre-configured for two-axis Ultra3000 drive system.
	CIML3*x*_3axis_v00*x*.acd	CompactLogix L3*x* file pre-configured for three-axis Ultra3000 drive system.

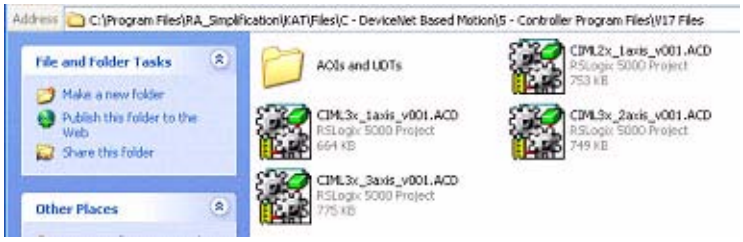
Load and Open Logix Application File

Follow these steps to load and open the Logix application file from the Kinetix Accelerator Toolkit CD.

1. Open the Kinetix Accelerator Toolkit program. From the Start menu, choose Programs>Rockwell Automation>Simplification>Kinetix Accelerator Toolkit.

2. From the Toolkit menu, choose DeviceNet Based Motion Applications>Controller Program Files.

3. Choose between the V16 and V17 CompactLogix Indexing Files folders based on your current version of RSLogix 5000 software.



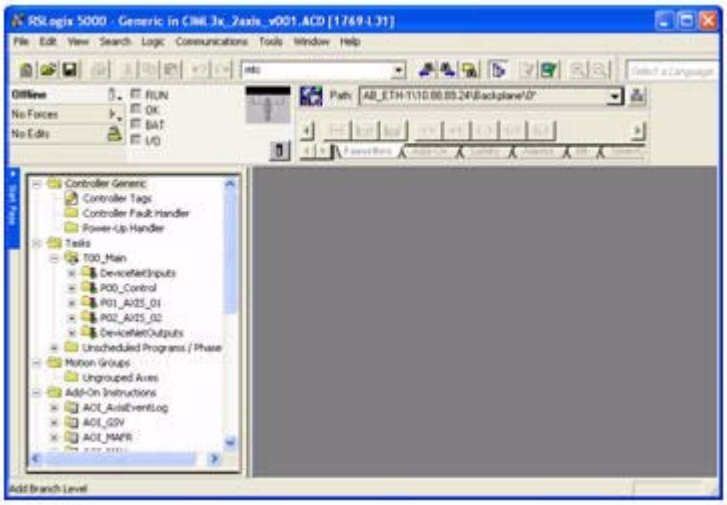
4. Double-click your selected Logix (.acd) application file.

TIP

If your Logix platform is a CompactLogix L2*x*, select the L2*x* application file (CIML2*x*_1axis_v00*x*.acd).

If your Logix platform is a CompactLogix L3*x*, select one of the pre-configured files for axis count (CIML3*x*_*x*axis_v00*x*.acd).

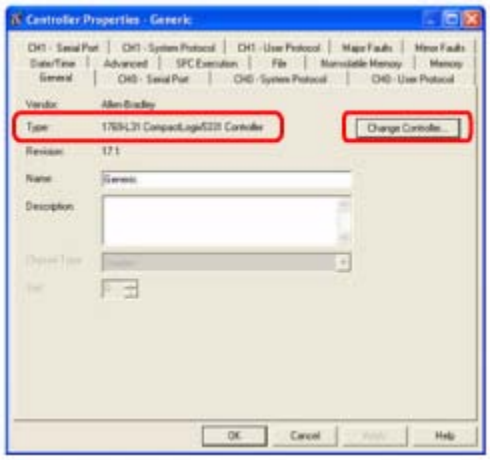
The RSLogix 5000 software launches and your application file opens.



Configure Your Logix System

Follow these steps to configure your Logix system to your needs.

Select Your CompactLogix Controller



1. Choose Edit>Controller Properties.

   The Controller Properties window opens.

2. Select the General tab.

3. Verify that the controller Type matches your system. If not, perform the following steps.

   a. Click Change Controller to select the controller type to match your actual hardware.

   b. Click OK.

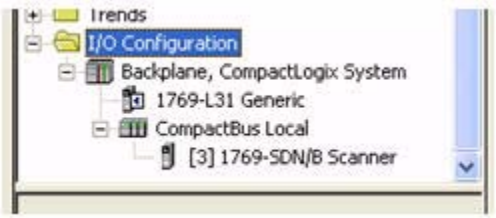
4. Modify the controller Name as appropriate.

5. Click OK.

Changing the Slot Number of the DeviceNet Module

(Optional) If you are using a pre-configured CompactLogix application file (CIML*xx_x*axis_v00*x*.acd), your Logix DeviceNet module is configured in slot 5. If this does not match your actual hardware configuration, follow the steps in this section to change the assigned slot number.

1. Scroll down to the bottom left of the RSLogix 5000 Explorer window and locate the I/O Configuration folder.
2. Double-click the 1769-SDN scanner module.
3. Verify the Slot address for this module and change it if necessary.
4. Click OK to close the properties window.

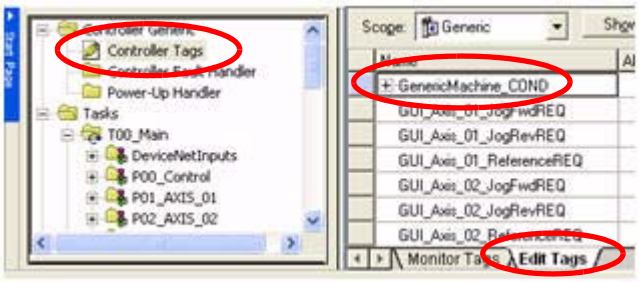


(Optional) To add additional I/O modules, right-click the CompactBus Local icon and select New Module.

Changing Controller Tag Names to Match Your Needs

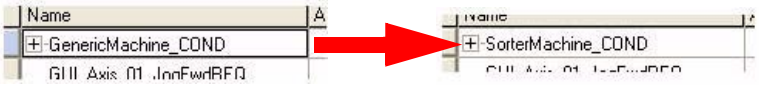
The CompactLogix Indexing Motion application file (CIML*xx_x*axis_v00*x*.acd) provided in this toolkit uses generic names for many of the controller tags. Providing useful names for these tags can aid in troubleshooting your machine. Follow these steps to rename the generic tags in your RSLogix 5000 program to reflect your needs.

1. In RSLogix 5000 software, expand the Explorer window to gain access to the controller tags.
2. Double-click Controller Tags.
3. Make sure the Edit Tags tab is in front.



4. Click the tag GenericMachine_COND and enter a name that better describes the main function of this machine.

In this example, GenericMachine_COND is renamed SorterMachine_COND.



Using the DeviceNet Tag Generator

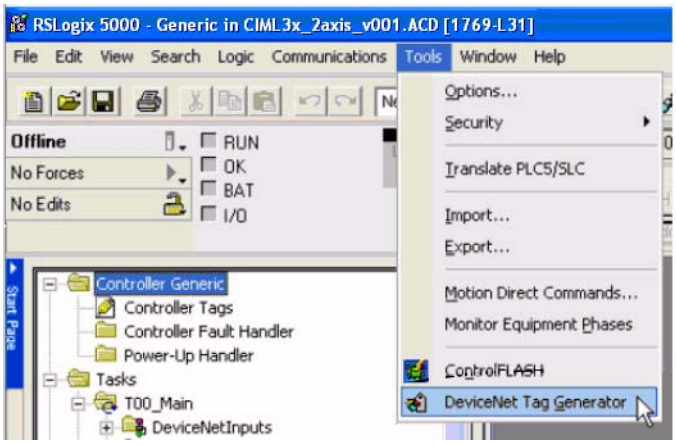
IMPORTANT You do NOT need to perform the steps in this section if the Ultra3000 drives were automapped to the DeviceNet scanner module in order, starting at node address 01.

Follow the steps in this section to enable communications to the axes of motion.

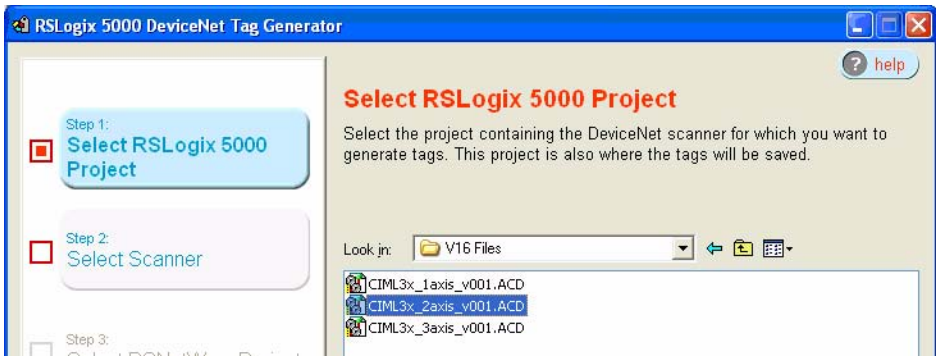
Open the DeviceNet Tag Generator

Follow these steps to open the DeviceNet Tag Generator.

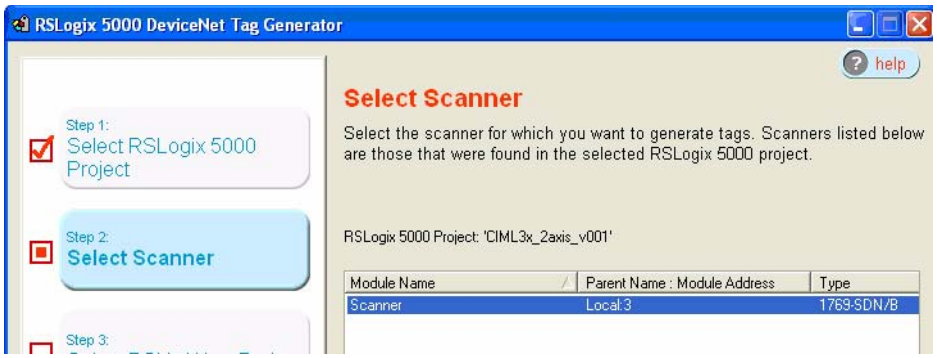
1. From the menu in RSLogix 5000, choose Tools>DeviceNet Tag Generator.



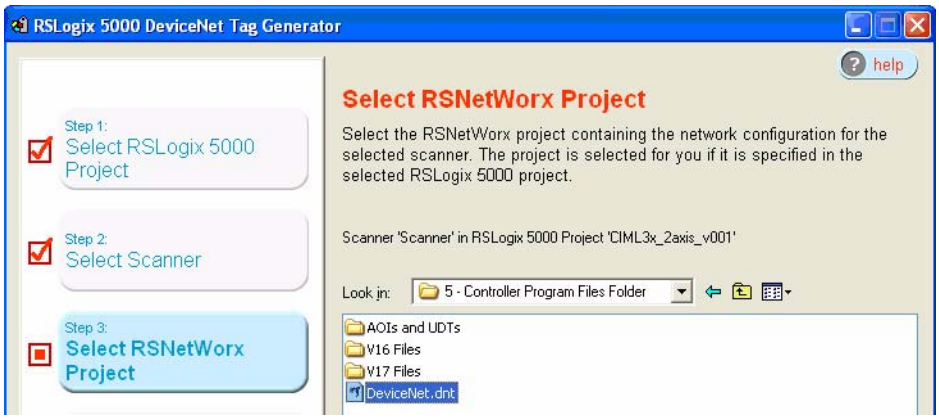
2. Step 1 of the wizard prompts you to locate the RSLogix 5000 file that you are presently using. Browse to the location of your Logix application file and double-click it. This selects the file and moves to the next step of the wizard.



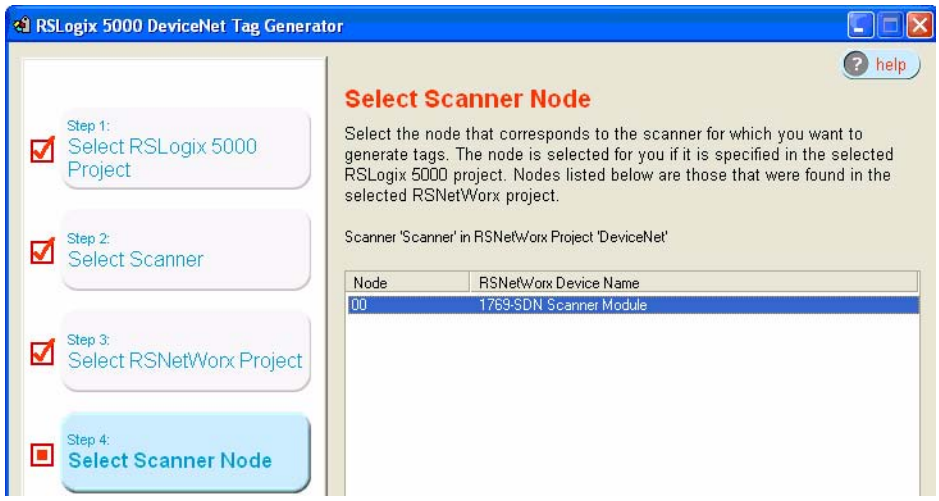
3. For wizard Step 2, locate and double-click the DeviceNet scanner configured earlier in this chapter.



4. For wizard Step 3, locate and double-click the DeviceNet configuration file saved earlier in this chapter.

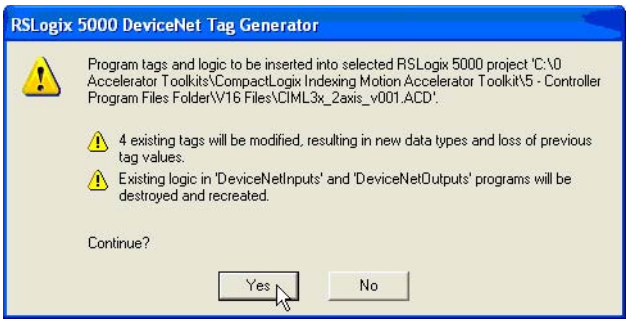

RSLogix 5000 DeviceNet Tag Generator
help
Step 1:
Select RSLogix 5000 Project
Step 2:
Select Scanner
Step 3:
Select RSNetWorx Project
Select RSNetWorx Project
Select the RSNetWorx project containing the network configuration for the selected scanner. The project is selected for you if it is specified in the selected RSLogix 5000 project.
Scanner 'Scanner' in RSLogix 5000 Project 'CIML3x_2axis_v001'
Look in:
5 - Controller Program Files Folder
AOIs and UDTs
V16 Files
V17 Files
DeviceNet.dnt

5. For wizard Step 4, locate and double-click the DeviceNet scanner node.


RSLogix 5000 DeviceNet Tag Generator
help
Step 1:
Select RSLogix 5000 Project
Step 2:
Select Scanner
Step 3:
Select RSNetWorx Project
Step 4:
Select Scanner Node
Select Scanner Node
Select the node that corresponds to the scanner for which you want to generate tags. The node is selected for you if it is specified in the selected RSLogix 5000 project. Nodes listed below are those that were found in the selected RSNetWorx project.
Scanner 'Scanner' in RSNetWorx Project 'DeviceNet'
Node
RSNetWorx Device Name
00
1769-SDN Scanner Module

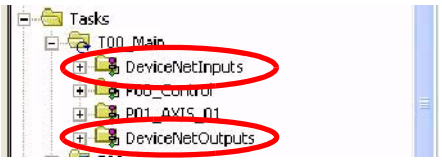
6. For wizard Step 5, click Generate Tags to finalize the process.

7. Click Yes to the prompt about inserting tags and logic.


RSLogix 5000 DeviceNet Tag Generator
Program tags and logic to be inserted into selected RSLogix 5000 project 'C:\0 Accelerator Toolkits\CompactLogix Indexing Motion Accelerator Toolkit\5 - Controller Program Files Folder\V16 Files\CIML3x_2axis_v001.ACD'.
4 existing tags will be modified, resulting in new data types and loss of previous tag values.
Existing logic in 'DeviceNetInputs' and 'DeviceNetOutputs' programs will be destroyed and recreated.
Continue?
Yes
No

8. There may be a warning that tags were created, but close the DeviceNet Tag Generator tool and return to your RSLogix 5000 project.

9. The program logic that was created can be found in the Tasks folder of the project.



Do not make any changes to these programs or logic, as your DeviceNet nodes may quit responding.

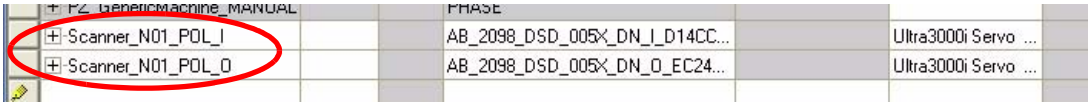
Link the New Tags to the DeviceNet Drives

These steps link the tags created by the tool to the axes programmed in the logic.

1. Double-click Controller Tags in the controller Explorer window to open the tag editor.

2. At the bottom of the editor window that opens, click the Edit Tags tab to enable editing.

3. Scroll to the bottom of the tag editor and locate the tags created by the Tag Generator tool. The name of the tags will start with the name you gave the DeviceNet scanner, 'Scanner' in our case.

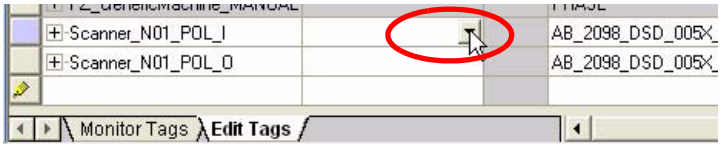


TIP

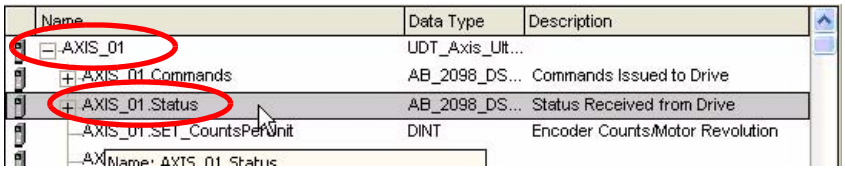
- The '*Nxx*' indicates the DeviceNet node address assigned to each component.
- The 'I' or 'O' indicates whether the data is an Input or an Output in reference to the DeviceNet scanner module.
- Scanner Inputs are the status coming back from the DeviceNet components.
- Scanner Outputs are the commands being issued to the DeviceNet components.

4. You will need to associate these tags to the existing axis logic provided in the Logix application file. In the 'Alias For' column next to the Scanner_N01_POL_I tag, click inside the box to enable the tag browser.

5. Open the tag browser by clicking the arrow.

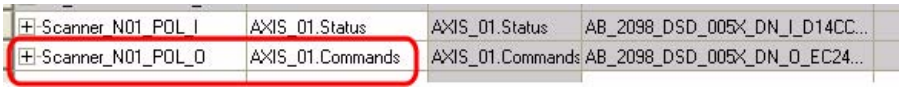


6. The axes of motion provided in the RSLogix 5000 sample file are named 'AXIS_01' ('AXIS_02' for the 2-axis version and so on). Expand the AXIS_01 entry and locate the Status tag. Double-click it to select it and close the tag browser.



This links the Status of the Ultra3000 drive at DeviceNet node 01 to the AXIS_01 programming logic and controller tag in the RSLogix 5000 sample file.

7. Similarly, alias the Scanner_N01_POL_O tag to the 'Commands' tag of AXIS_01.



8. If you have more than one servo drive, repeat this process to alias the remaining nodes to the axis programming. Be sure to alias the 'I' input data to the Status tag and the 'O' output data to the Commands tag for each device.

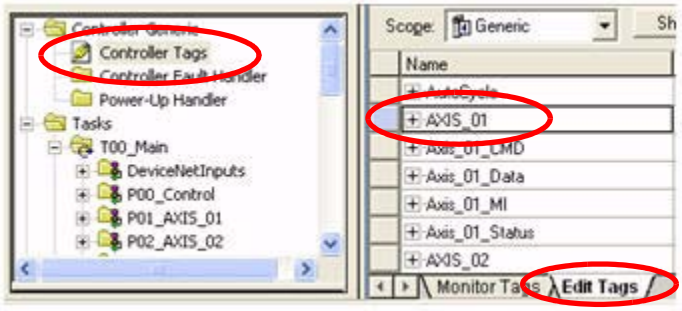
Configure Axis Properties

Follow these steps to configure the axes of motion.

Modify Axis Names

The CompactLogix Indexing Motion application file (CIML*xx_x*axis_v00*x*.acd) contains program code for up to three axes, however, you may want to rename the axes from AXIS_0*x* to something more meaningful for your application. Providing useful names for these axes can aid in troubleshooting your machine. Follow these steps to rename the generic axes in your RSLogix 5000 program to reflect your needs.

1. In RSLogix 5000 software, expand the Explorer window to gain access to the controller tags.



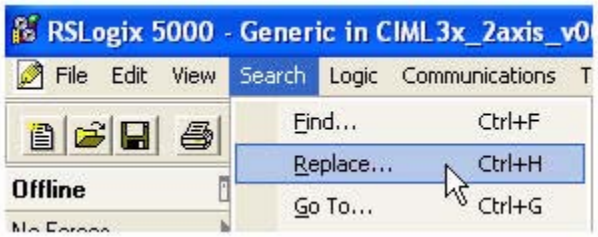
2. Double-click Controller Tags.

3. Make sure the Edit Tags tab is in front.

4. Click AXIS_01 and enter a name that better describes the main function of this axis.

   In this example, AXIS_01 is renamed CONVEYOR.

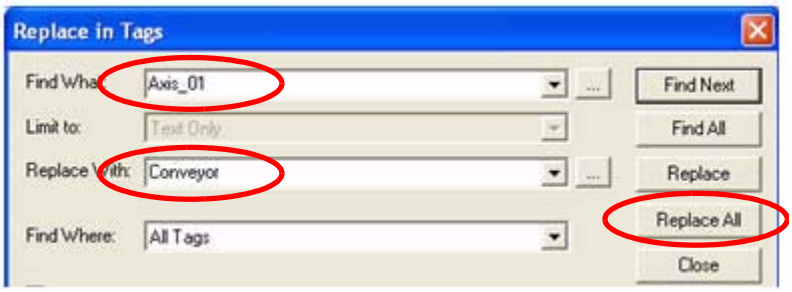
5. There are additional tags associated with each axis. With the Controller Tag dialog box still open, choose Search>Replace.



6. Rename all tags with Axis_01 with your new axis name.

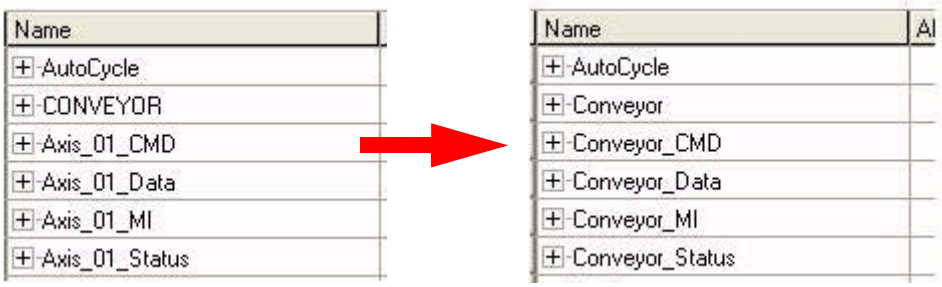
7. Click Replace All.

8. When the process has completed, click Close.



9. Repeat step 4…step 8 for each additional axis.

The result might look like this.

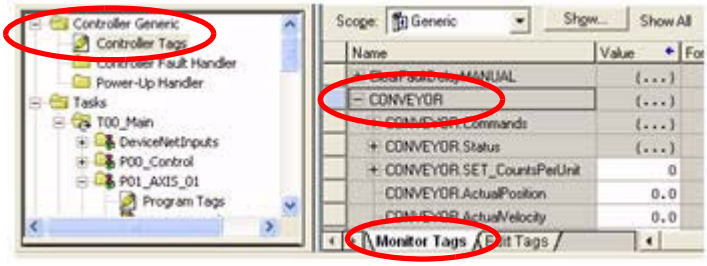


Set the Axis k Constant

The CompactLogix Indexing Motion application file (CIML*xx_x*axis_v00*x*.acd) allows you to program all motion instructions in user units (inches or degrees, for example) instead of encoder counts. You will need to set the conversion factor (or k constant) from user units to encoder counts to allow the drive to be commanded properly. Follow these steps to set the k constant for each axis in your RSLogix 5000 program.

1. In RSLogix 5000 software, expand the Explorer window to gain access to the controller tags.

Double-click Controller Tags.

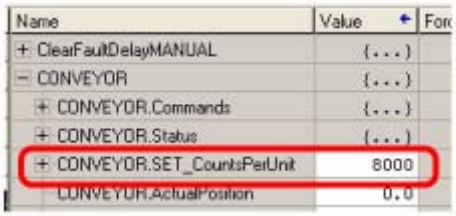


2. Make sure the Monitor Tags tab is in front.

3. Locate and expand the tag for each axis in your system. You may have renamed them from their original AXIS_0*x* name.

The third tag element in the list for each axis is the *name*.SET_CountsPerUnit tag. This is where the k constant is entered.

4. If needed, consult the documentation for your mechanical system components and your servo motor to calculate your k constant. Enter the number of encoder counts per desired user unit in the space provided.



All values entered in your Logix motion instructions will now be scaled by this value.

IMPORTANT Please note this scaling effect when entering your desired speeds, positions, and acceleration rates in your motion instructions.

5. Repeat step 3 and step 4 for each additional axis.

TIP For a better understanding of the code provided in the sample file, as well as the benefits of PhaseManager, refer to Appendix A, CompactLogix Base Program Overview on page 95.

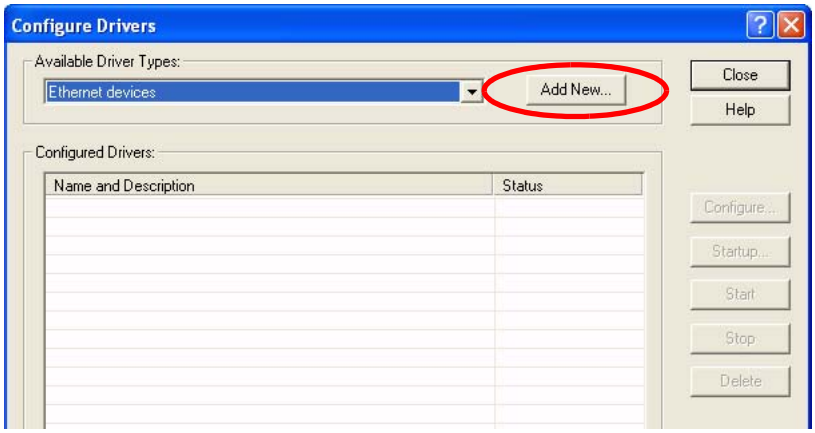
Configure Logix Communications

This procedure assumes that your communication method to the Logix controller is using the Ethernet protocol. It is also assumed that your Logix Ethernet module has already been configured. For additional information, refer to the CompactLogix Controllers User Manual, publication 1769-UM011.

Follow these steps to configure Logix Communications.

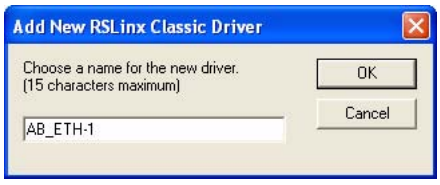
1. Apply power to your Logix chassis/personal computer containing the DeviceNet interface module.
2. Open the RSLinx Classic software and choose Communications>Configure Drivers.

   The Configure Drivers window opens.



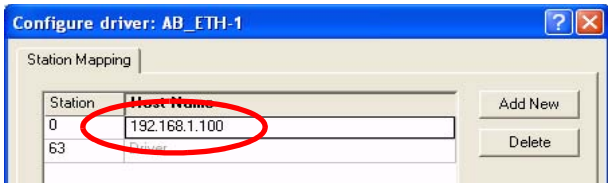
3. Choose the Ethernet Devices driver from the pull-down list.
4. Click Add New.

   The Add New RSLinx Classic Driver window opens.



5. Name the new driver.
6. Click OK.

   The Configure driver window opens.



7. Enter the IP address of your Logix Ethernet Module.

The IP address shown is an example. Yours will be different.

TIP If your Logix Ethernet module is already configured, the IP address is displayed on the module.

8. Click OK.

9. Click Close in the Configure Drivers window.

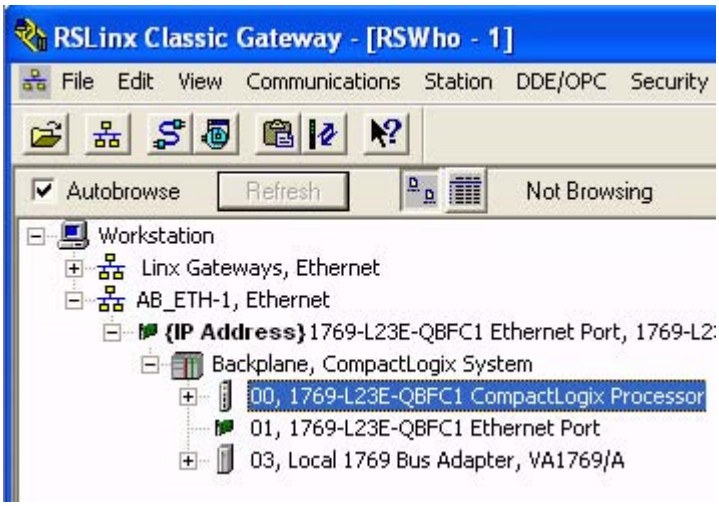
10. Choose Communication>RSWho.

    The RSWho window opens.

11. Expand the 1769 Ethernet Port and then expand the Backplane.

12. Verify that you can browse to your Logix controller. If not, repeat step 1…step 11, checking for any errors.

13. Minimize the RSLinx Classic application window and return to the RSLogix 5000 project window.



Save and Download Your Program

After completing the Logix configuration, you must download your program to the Logix controller.

Follow these steps to save and download your program.

1. On the RSLogix 5000 toolbar, click Verify Controller.

   The system verifies your Logix controller program and displays errors/warnings, if any.

TIP If you receive warnings related to AXIS_Servo_Generic, they are due to the Fault Event Log configuration and can be ignored.

2. Choose File>Save As to save the file.

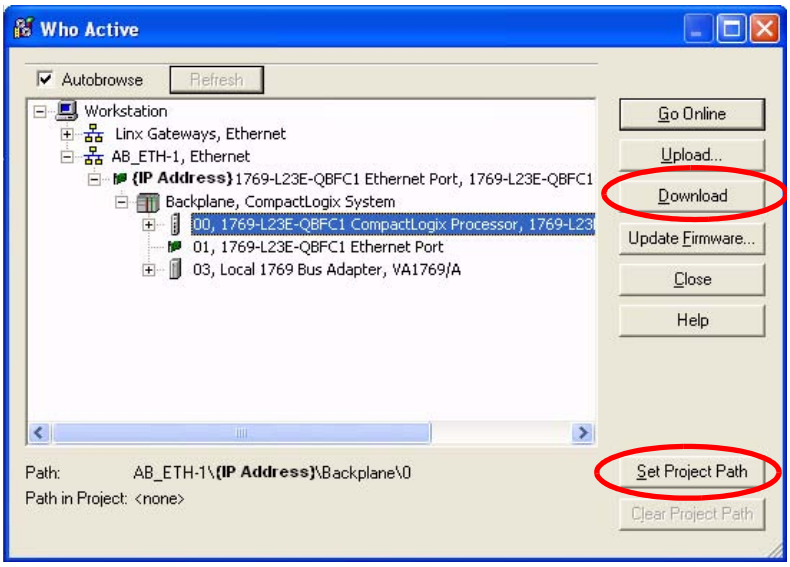
3. Choose Communications>Who Active.

   The Who Active window opens.

4. Browse to your Logix controller and click Set Project Path.

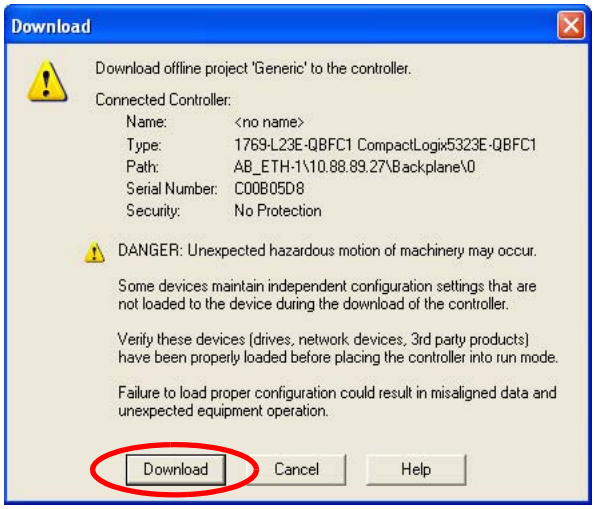
5. Verify that the key switch on your controller module is in the REM (remote) position.

6. Click Download.



   The Download window opens.

7. To send the program to the Logix controller, click Download.


Download
Download offline project 'Generic' to the controller.
Connected Controller:
Name: <no name>
Type: 1769-L23E-QBFC1 CompactLogix5323E-QBFC1
Path: AB_ETH-1\10.88.89.27\Backplane\0
Serial Number: C00B05D8
Security: No Protection
DANGER: Unexpected hazardous motion of machinery may occur.
Some devices maintain independent configuration settings that are not loaded to the device during the download of the controller.
Verify these devices (drives, network devices, 3rd party products) have been properly loaded before placing the controller into run mode.
Failure to load proper configuration could result in misaligned data and unexpected equipment operation.
Download
Cancel
Help

8. Verify that the three Logix DeviceNet module indicators are green. (Some may be flashing.)

9. Verify that the Ultra3000 servo drive LED indicators are both green. (Some may be flashing.)

   If steps 8 or 9 fail, refer to the Ultra3000 Digital Servo Drive Installation Manual, publication 2098-IN003, for troubleshooting tables.

10. Choose Communications>Run Mode.

Notes:

Motion FactoryTalk View Integration

In this chapter, you configure your FactoryTalk View ME application file. FactoryTalk View ME application files (.apa) are included in the Kinetix Accelerator Toolkit.

You can choose:

- 1-, 2-, or 3-axis pre-configured FactoryTalk View ME application file for PanelView Plus 600 terminals.
- 2-axis generic base application file for a variety of PanelView Plus terminals.

After file selection, you configure the communications, add axes if needed, test the project, download the program, and run the application.

Before You Begin

- Complete the Kinetix Accelerator Toolkit CD installation. (Refer to Chapter 1.)
- Complete your system hardware selection. (Refer to Chapter 2.)
- Complete your system layout. (Refer to Chapter 3.)
- Complete your system wiring. (Refer to Chapter 4.)
- Complete your Logix Integration procedures. (Refer to Chapter 5.)

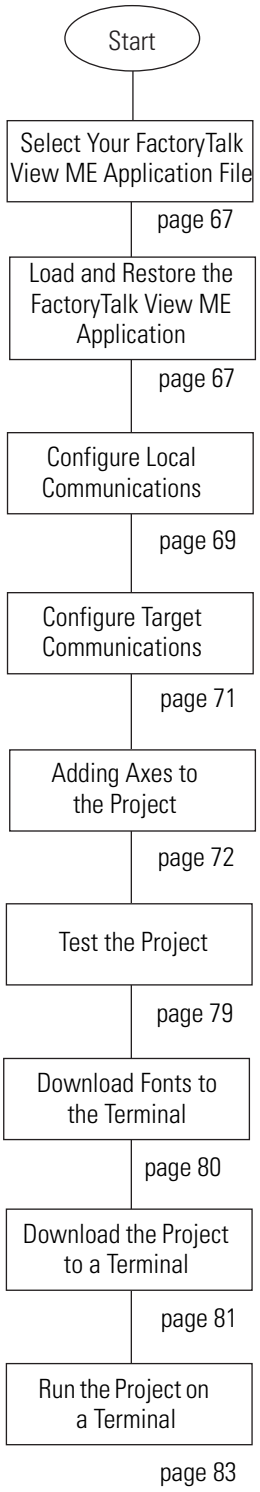
What You Need

- Kinetix Accelerator Toolkit CD, publication IASIMP-SP004
- FactoryTalk View Studio software, version 5.00 or later
- RSLinx Enterprise software, version 2.54 or later
- FactoryTalk View ME application files (CIMME_*x*axis_U3k_PVP600_v00*x*.apa)

  FactoryTalk View ME files are available on the Kinetix Accelerator Toolkit CD. For a copy of the CD, contact your local Rockwell Automation distributor or sales representative.

Follow These Steps

Complete the following steps to configure your FactoryTalk View ME Indexing Motion application.



Select Your FactoryTalk View ME Application File

PanelView Terminal	FactoryTalk View ME File Name	Description
PanelView Plus 600	CIMME_1axis_U3k_PVP600_v00*x*.apa	PanelView Plus 600 terminal pre-configured for single-axis Ultra3000 drive system.
	CIMME_2axis_U3k_PVP600_v00*x*.apa	PanelView Plus 600 terminal pre-configured for two-axis Ultra3000 drive system.
	CIMME_3axis_U3k_PVP600_v00*x*.apa	PanelView Plus 600 terminal pre-configured for three-axis Ultra3000 drive system.
PanelView Plus 700/1000	CIMME_ U3k_PVP700_1000_v00*x*.apa	FactoryTalk View ME file for generic base application. Can be configured for any Ultra3000 drive configuration and PanelView Plus terminal.
PanelView Plus 1250	CIMME_ U3k_PVP1250_v00*x*.apa	
PanelView Plus 1500	CIMME_ U3k_PVP1500_v00*x*.apa	

Load and Restore the FactoryTalk View ME Application

Follow these steps to load and restore the FactoryTalk View ME application file from the Kinetix Accelerator Toolkit CD.

1. Open the Kinetix Accelerator Toolkit program. From the Start menu, choose Programs>Rockwell Automation>Simplification>Kinetix Accelerator Toolkit.

2. From the Toolkit menu, choose DeviceNet Based Motion Applications >HMI Application Files.

3. Select the appropriate HMI directory based on the table above.

4. Double-click your selected FactoryTalk View ME (.apa) application file.

TIP

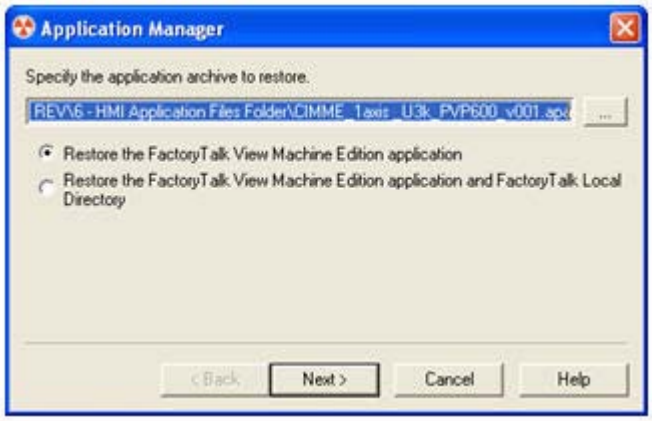
If you are using any PanelView Plus terminal with any axis count, select the generic base application file (CIMME_PVP*xxxx*_v00*x*.apa).

If you are using the PanelView Plus 600 terminal for a specific axis count (up to three axes), select one of the pre-configured files for axis count (CIMME_*x*axis_PVP600_ v00*x*.apa).

The Application Manager window opens.

5. Select Restore the FactoryTalk View Machine Edition application.

6. Click Next.


Application Manager
Specify the application archive to restore.
REV\6 - HMI Application Files Folder\CIMME_1axis_U3k_PVP600_v001.apa
Restore the FactoryTalk View Machine Edition application
Restore the FactoryTalk View Machine Edition application and FactoryTalk Local Directory
< Back
Next >
Cancel
Help

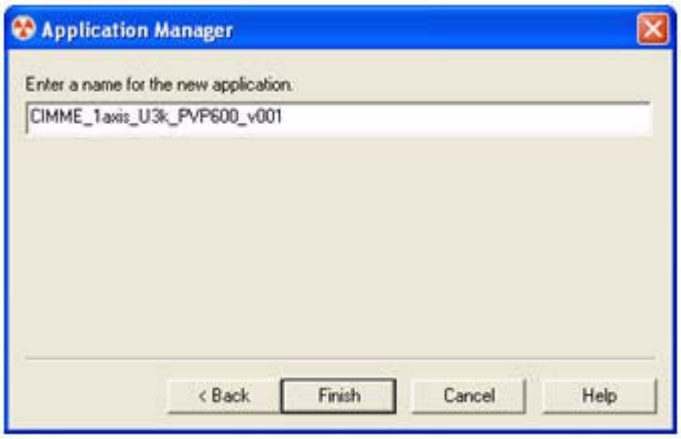
Another Application Manager window opens.

IMPORTANT Selecting Restore the FactoryTalk View Machine Edition application and FactoryTalk Local Directory will cause the local security settings on your personal computer to substitute for the security setting from the pre-configured application.

In this example the CIMME_1axis_U3k_PVP600_v001.apa file is selected. Yours could be different.

7. Click Finish.

After file restoration is complete, the application closes.



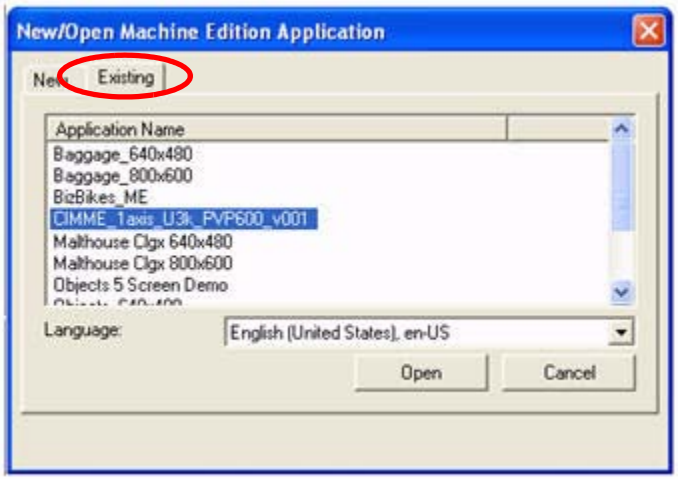
Configure Local Communications

The Local tab in Communications Setup reflects the view of the topology from the RSLinx Enterprise server on the development computer. In this example application, the development computer is communicating to the CompactLogix L32E controller via Ethernet network. Other CompactLogix controllers and communication networks can also be selected.

Follow these steps to configure local communications.

1. Apply power to your CompactLogix controller.
2. Connect your motion system communication network cable to your CompactLogix controller and personal computer.
3. Open the FactoryTalk View Studio software.

   The New/Open Machine Edition Application window opens.



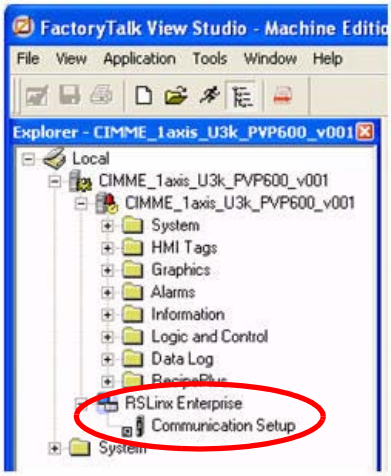
4. Click the Existing tab.
5. Select your FactoryTalk View ME application file.

   CIMME_1axis_U3k_PVP600_v001 is used in this example.

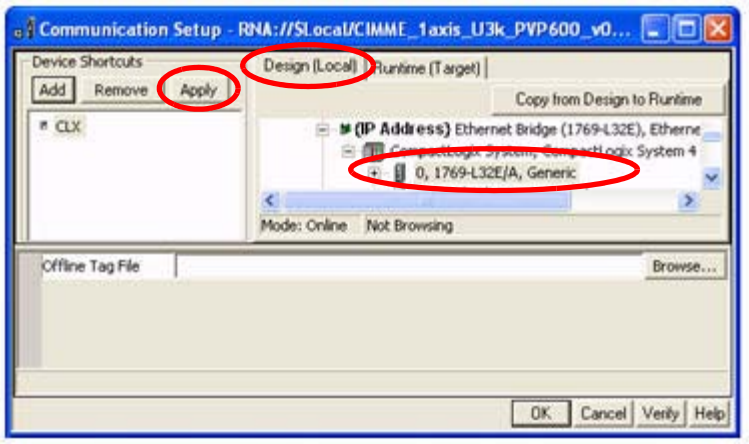
6. Click Open.

   The FactoryTalk View Studio - Machine Edition window opens.

7. Expand RSLinx Enterprise in the Explorer window.
8. Double-click Communications Setup.



The Communications Setup window opens.



9. Click the Design (Local) tab.

10. Select the CLX device shortcut.

11. Expand the RSLinx Enterprise tree to gain access to your CompactLogix controller.

12. Select your CompactLogix controller.

0, 1769-L32E is used in this example. The slot number is 0. Yours could be different.

IMPORTANT RSLinx Enterprise will autobrowse to the controller if the controller is available on the network. If RSLinx Enterprise fails to find your controller, refer to CompactLogix System Quick Start manual, publication IASIMP-QS001.

13. In the Device Shortcuts section, click Apply.

TIP If you select the device shortcut (CLX), the 1769-L32E CompactLogix controller is highlighted. This indicates that the shortcut is correctly mapped to the controller, and communication exists between the controller and your application on the development computer.

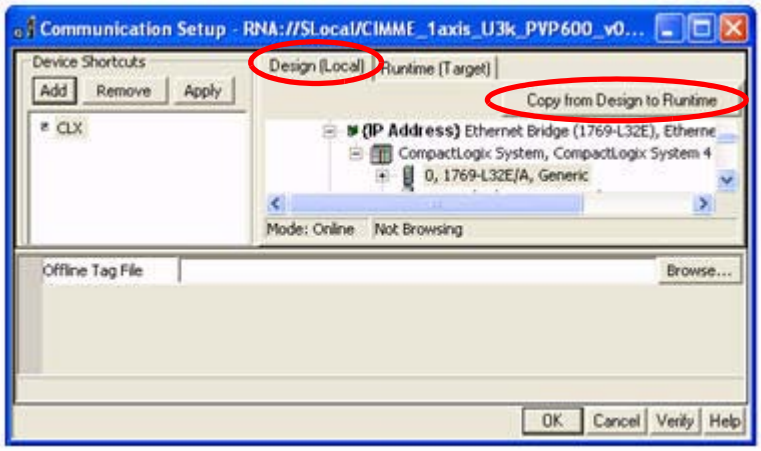
Configure Target Communications

The Target tab displays the offline configuration from the perspective of the device that is running the application and comprises the topology that is loaded into the PanelView Plus terminal. In this example application, the PanelView Plus terminal communicates to the same CompactLogix L32E controller via Ethernet.

Follow these steps to configure target communications.

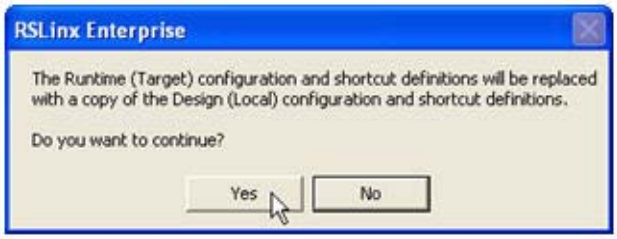
1. Click the Design (Local) tab in the Communication Setup window.

2. Click Copy from Design to Runtime.



This RSLinx Enterprise message window opens.

3. Click Yes.


RSLinx Enterprise
The Runtime (Target) configuration and shortcut definitions will be replaced with a copy of the Design (Local) configuration and shortcut definitions.
Do you want to continue?
Yes
No

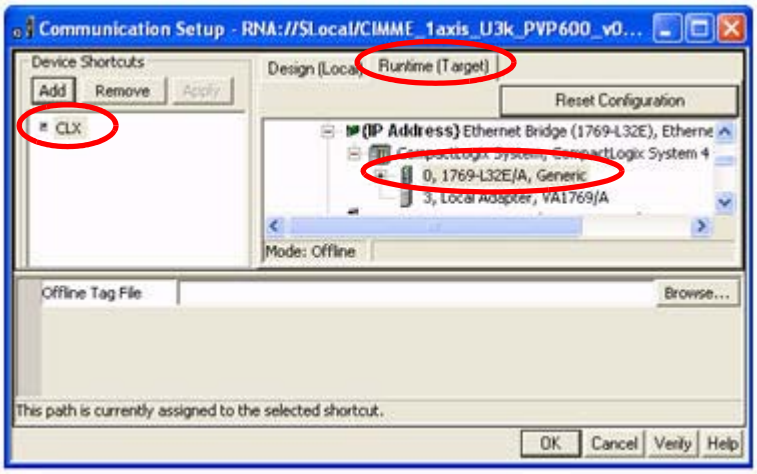
4. Click the Runtime (Target) tab and expand the RSLinx Enterprise tree.

5. Verify that your controller and shortcut name are both highlighted.

   This indicates that communication is established.

   In this example, 1769-L32E is the controller and CLX is the shortcut.

6. Click OK.



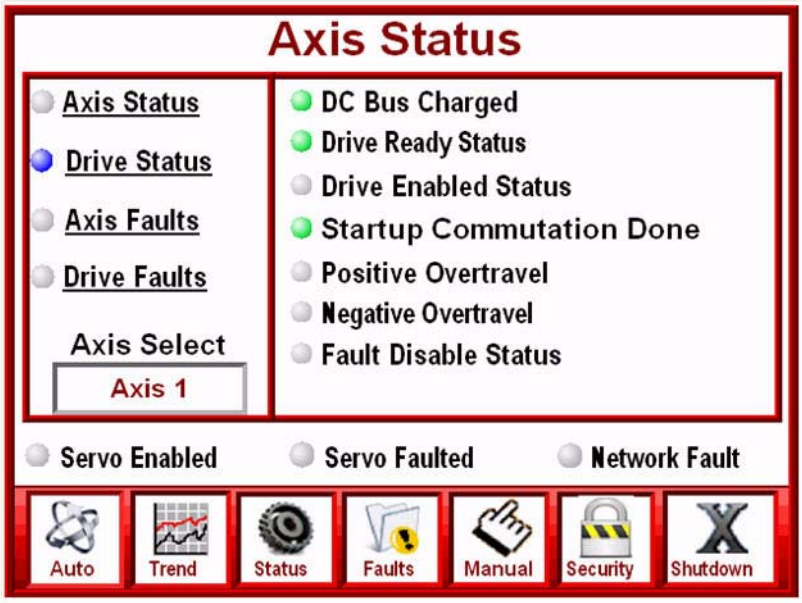
Adding Axes to the Project

IMPORTANT If you have selected a pre-configured application with a specific axis count and it fits your application needs, skip this section and go to Modifying Axis Names beginning on page 77.

The CIMME_U3k_PVP*xxxx*_v00*x*.apa file has two pre-configured axes for use. In this section you will add additional axes to your Ultra3000 drive system and the project file.

All the displays in the project file are parameterized to facilitate quick editing and reuse throughout the application. The following Axis Status display contains faults and status information that is common to all configured axes (Axis1…Axis*x*).

Axis Status Display

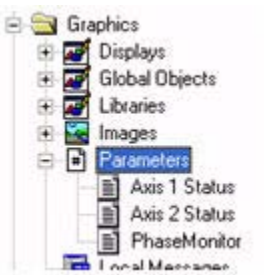


Add the Parameter File

Follow these steps to add a parameter file to your FactoryTalk View ME application.

1. Expand the FactoryTalk View ME Explorer window to gain access to Parameters.

   The parameters list contains the pre-configured axes within the application. Each parameter file is associated with a specific axis. When opening the Axis Status display, the tag information loads from the axis currently selected.



2. Right-click Axis *x* Status and select Duplicate.

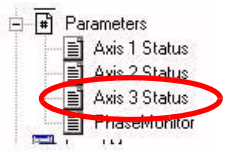
The Save component name window opens.

3. Name the new parameter file.

In this example, there are two existing pre-configured axes. We are duplicating and renaming the Axis 1 Status parameter file. The new name is Axis 3 Status. Yours could be different.

4. Click OK.

5. Double-click the Axis 3 Status parameter file created in step 3.



The Axis *x* Status - CIMME_U3k_PVP*xxxx*_v00*x*/Parameters window opens.

In each parameter file, there are three references to specific tags or partial strings. The # before a number indicates a parameterized tag. (The ! before any text indicates that line is a comment.)

Parameter #1 contains the shortcut name (CLX in this example). This should match the shortcut name used in step 10 on page 70.

Parameter #2 represents the specific axis from which you will be requesting data.

Parameter #3 is a string memory tag that exists in the tag database editor. A new tag must be created each time a new axis is created so that the displays are updated correctly.

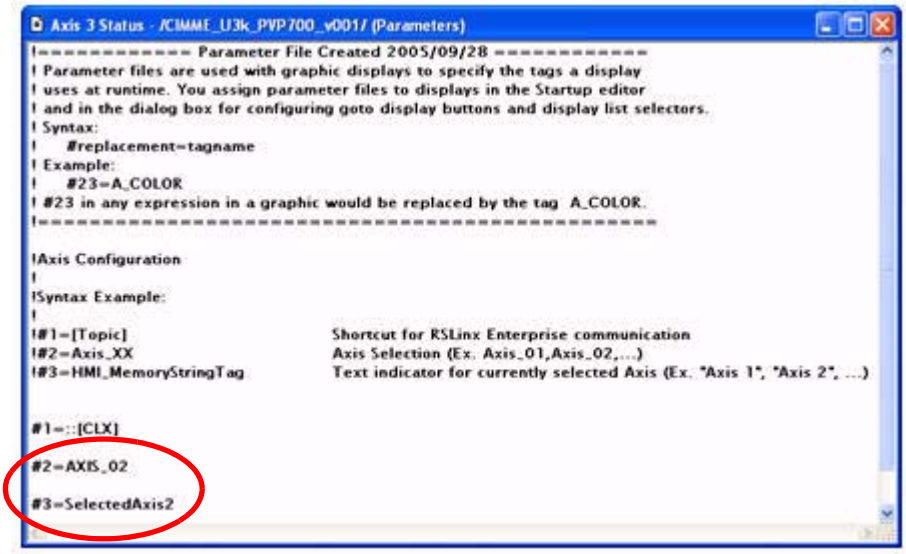
IMPORTANT All pre-configured application files have four SelectedAxis*x* memory tags created for them. New tags must be created for axis counts of five or more.

6. Edit parameters 2 and 3.

In this example:

#2 = AXIS_02
becomes
#2 = AXIS_03

#3 = SelectedAxis2
becomes
#3 = SelectedAxis3


Axis 3 Status - /CIMME_U3k_PVP700_v001/ (Parameters)
!============ Parameter File Created 2005/09/28 ============
! Parameter files are used with graphic displays to specify the tags a display
! uses at runtime. You assign parameter files to displays in the Startup editor
! and in the dialog box for configuring goto display buttons and display list selectors.
! Syntax:
! #replacement=tagname
! Example:
! #23=A_COLOR
! #23 in any expression in a graphic would be replaced by the tag A_COLOR.
!==========
!Axis Configuration
!
!Syntax Example:
!
!#1=[Topic] Shortcut for RSLinx Enterprise communication
!#2=Axis_XX Axis Selection (Ex. Axis_01,Axis_02,...)
!#3=HMI_MemoryStringTag Text indicator for currently selected Axis (Ex. "Axis 1", "Axis 2", ...)
#1=::[CLX]
#2=AXIS_02
#3=SelectedAxis2

7. Choose File>Save.

8. Repeat step 2…step 7 as necessary for your axis count.

9. The pre-configured application files include HMI tags for up to four axes.

If your axis count is	Then go to
Four or less	Edit Display Files on page 75
Five or more	Add an HMI Tag on page 74

Add an HMI Tag

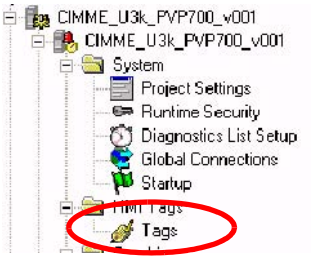
In this section, you create an HMI string tag for each parameter file (for Axis 5 or greater) created in Add the Parameter File.

Follow these steps to add an HMI tag to your FactoryTalk View ME application.

1. Expand your application file in the Explorer window.

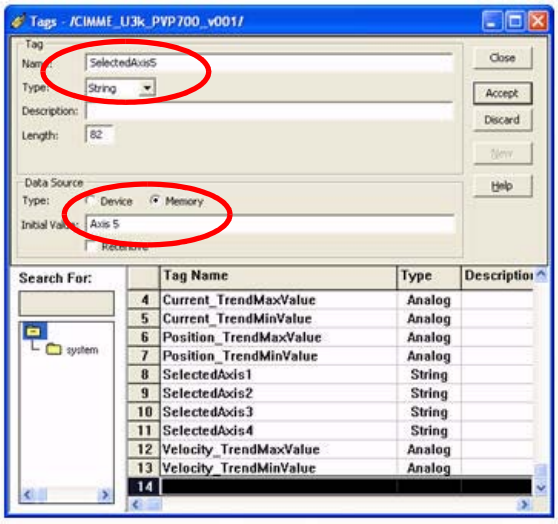
2. Double-click Tags.

The Tags editor window opens.



3. Click the first empty row in the Tags editor window.

   Row 14 is used in this example. Yours could be different.



4. Enter 'SelectedAxis*x*' in the Name field.

   SelectedAxis5 is used in this example. Yours could be different.

5. Select String from the pull-down menu in the Tag Type field.

6. Select Memory in the Data Source Type field.

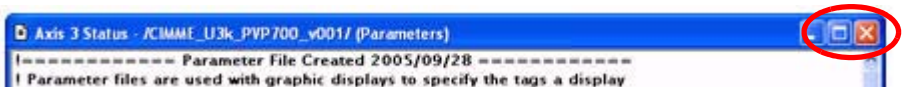
7. Enter 'Axis *x*' in the Initial Value field.

   Axis 5 is used in this example. Yours could be different. This is the text that is displayed on the graphic display.

8. Click Accept. (Leave default values for Description and Length as is.)

9. Repeat step 3…step 8 for each newly created parameter file (for Axis 5 or greater).

10. Click the Close button <X> in the Axis *x* Status parameter file window to close the window.

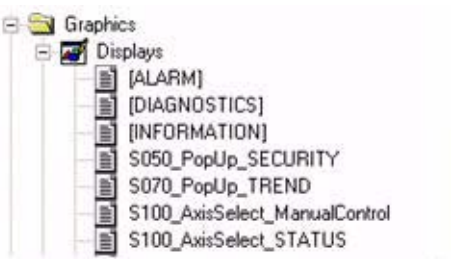

Axis 3 Status - /CIMME_U3k_PVP700_v001/ (Parameters)
!---------- Parameter File Created 2005/09/28 ----------
! Parameter files are used with graphic displays to specify the tags a display

Edit Display Files

Follow these steps to edit the display files.

1. Return to the Explorer window and expand the Displays editor.

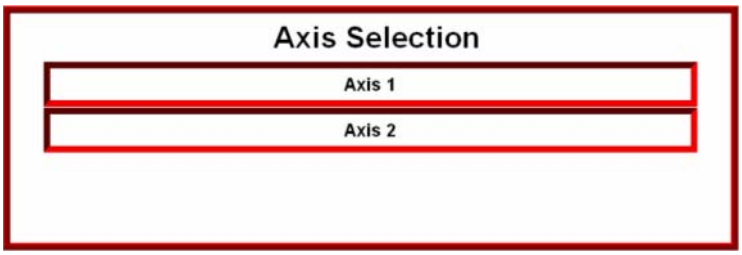
   In this example, these are the displays that are visible. Yours could be different.



IMPORTANT All displays containing the text 'AxisSelect' require updating for each new parameter file created in Add the Parameter File on page 72.

2. Double-click the S100_AxisSelect_ManualControl display, or the first AxisSelect display in the list of displays.

The Axis Selection display dialog box opens.



3. Right-click the last axis shown (Axis 2 for this example.)

4. Select Copy.

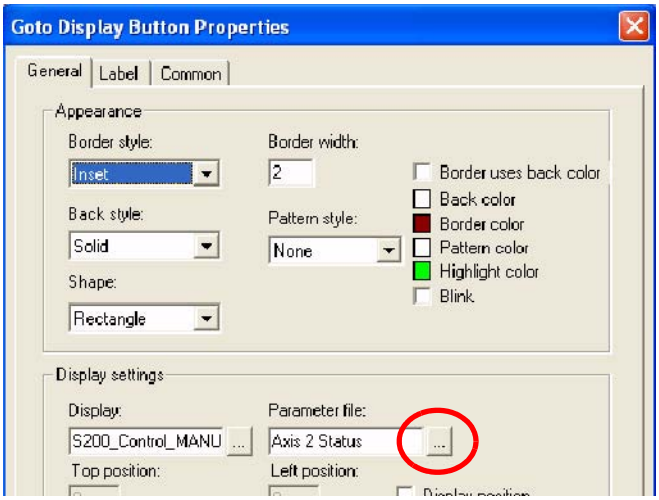
5. Right-click under Axis 2 (or the last axis shown) and select Paste.

6. Click the pasted axis (new Axis 2 in this example), drag and drop the axis in line beneath the others.

7. Right-click the new axis and select Properties.

The Goto Display Button Properties window opens.

8. Click **...** to browse for the parameter file.



The Component Browser window opens.

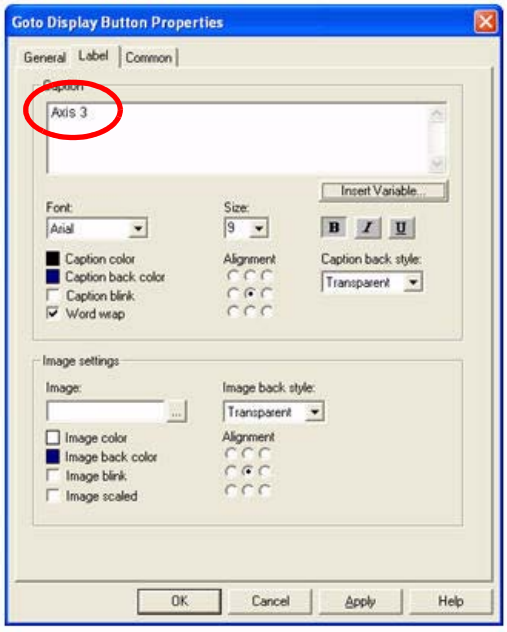
9. Select the new axis (in this example, Axis 3 Status).

10. Click OK.

11. Return to the Goto Display Button Properties window and select the Label tab.

12. Edit the text in the Caption field.

In this example Axis 2 becomes Axis 3.



13. Click OK to close the Goto Display Button Properties window.

14. Verify that Axis Selection now includes your new axis (Axis 3 in this example.)

15. Repeat step 1…step 14 for each new axis and each of the AxisSelect displays identified in step 1.

Modifying Axis Names

Your FactoryTalk View ME application file (CIMME_U3k_PVP*xxxx*_v00*x*) now contains program code for three axes. However, you may want to rename the axes from AXIS_01, AXIS_02, and AXIS_03 to something more meaningful for your application, like Conveyor, for example.

Edit Axis Shortcuts

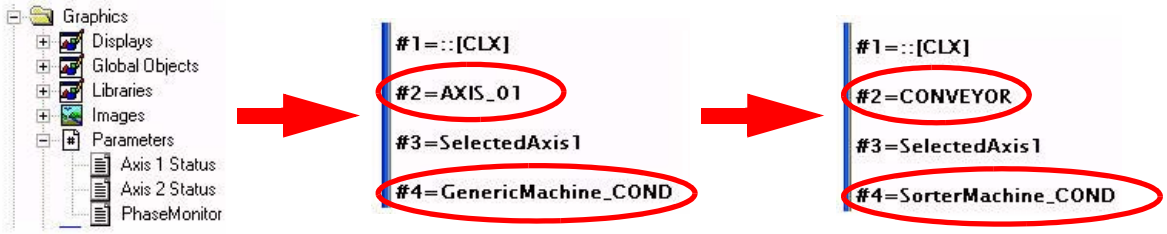
IMPORTANT Follow these steps to rename the axes in your FactoryTalk View ME program if you changed the names of the axes in your CompactLogix application file.

In this example, AXIS_01 is renamed CONVEYOR and GenericMachine_COND is renamed SorterMachine_COND to match the changes in our Logix application in Chapter 5 Motion Logix Integration.

1. In FactoryTalk View ME software, expand the Explorer window to gain access to Parameters.

   If needed, refer to Add the Parameter File on page 72 to see how that was done.

2. Double-click the Axis 1 Status file.



3. Rename the #2 and the #4 shortcut to match the axis and machine names used in your RSLogix 5000 program file.

4. Repeat step 2…step 3 for each axis to rename the shortcuts.

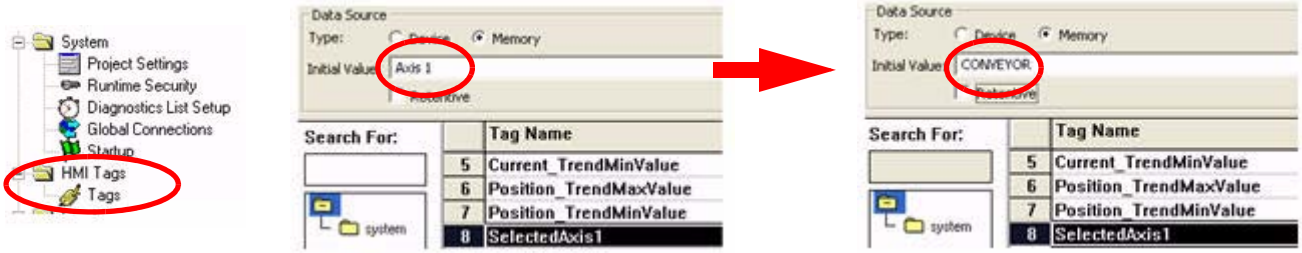
Edit Axis Display Names

Follow these steps to provide meaningful names to the axes as they are displayed on the operator interface. You will change the Initial Value field for the HMI tags. In this example, Axis 1 is renamed Conveyor.

1. In FactoryTalk View ME software, expand the Explorer window to gain access to HMI tags.

   If needed, refer to Add an HMI Tag on page 74 to see how that was done.

2. Rename the Initial Value field to match the axis name used in your RSLogix 5000 program file.



3. Repeat step 2 for each SelectedAxis*x* HMI tag.

Test the Project

FactoryTalk View Studio lets you create and test individual displays or the entire project, so that you can navigate and test all the functionality before downloading your project to a terminal.

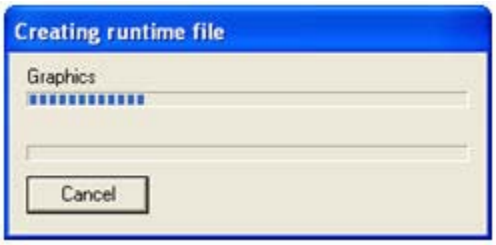
IMPORTANT To test run the project, all communications must be configured first.

Follow these steps to test your FactoryTalk View Studio project.

1. Choose Application>Test Application.

2. If prompted to save changes, click Yes.

3. The FactoryTalk View Studio software compiles the project and runs it as if it were executing on the desired terminal.



4. Press 'x' to end testing and shut down the application.

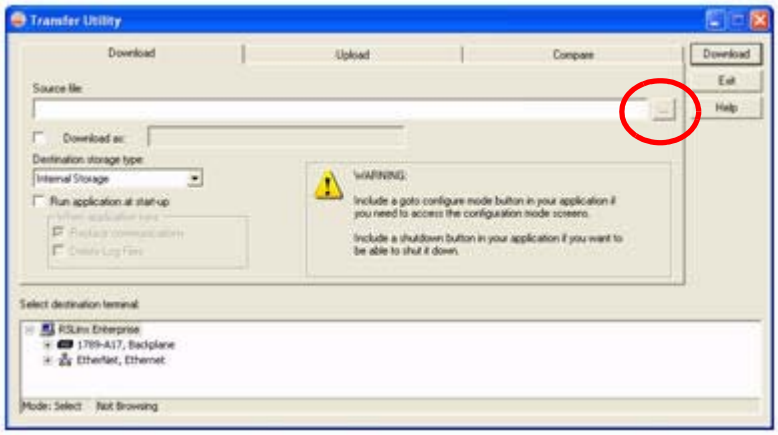
Download Fonts to the Terminal

Because PanelView Plus terminals do not include the Arial Bold font when shipped but the FactoryTalk View ME applications require this font, it is necessary to download Arial Bold from your personal computer to the PanelView Plus terminal.

Follow these steps to download fonts to the PanelView Plus terminal.

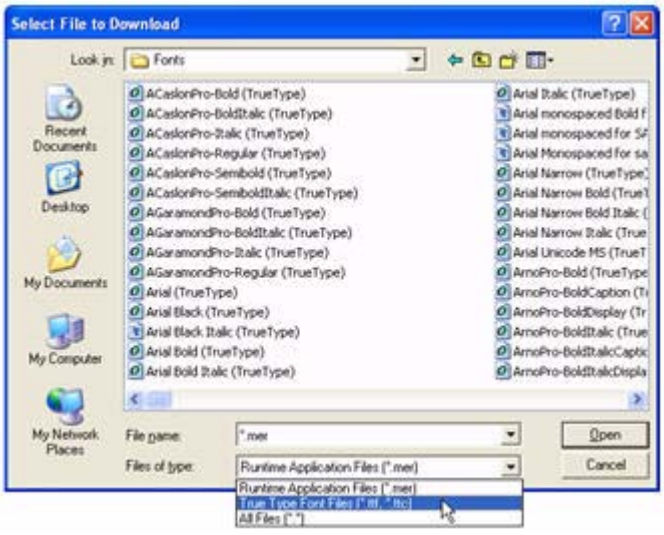
1. Apply power to the PanelView Plus terminal.
2. Connect your Ethernet cable between your PanelView Plus terminal and personal computer.
3. Choose Tools>Transfer Utility.

   The Transfer Utility window opens.



4. Click … to browse for the source font file.

   The Select File to Download window opens.



5. Navigate to C:\WINDOWS\Fonts.
6. Select True Type Font Files in the Files of type field.
7. Enter ‘Arialbd.ttf’ in the File name field.
8. Click Open.

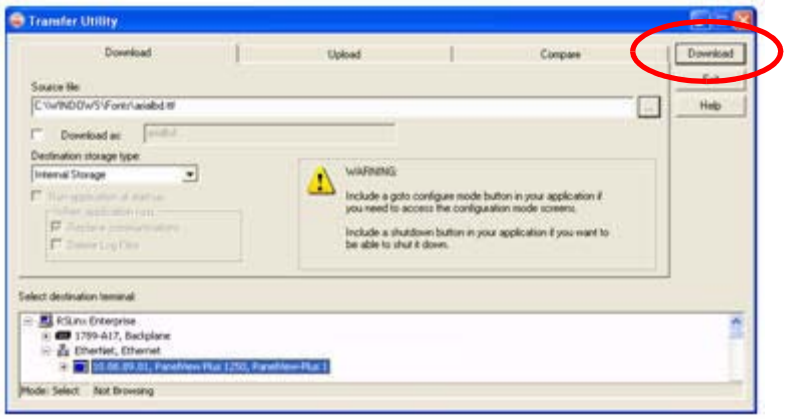
The Transfer Utility window returns.

9. Expand the Ethernet, Ethernet driver.

10. Select your PanelView Plus terminal.

11. Click Download.

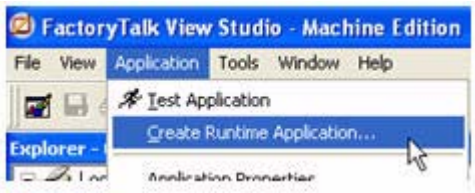
    The font transfers to the terminal.



Download the Project to a Terminal

Follow these steps to download your FactoryTalk View Studio project.

1. Choose Application>Create Runtime Application.



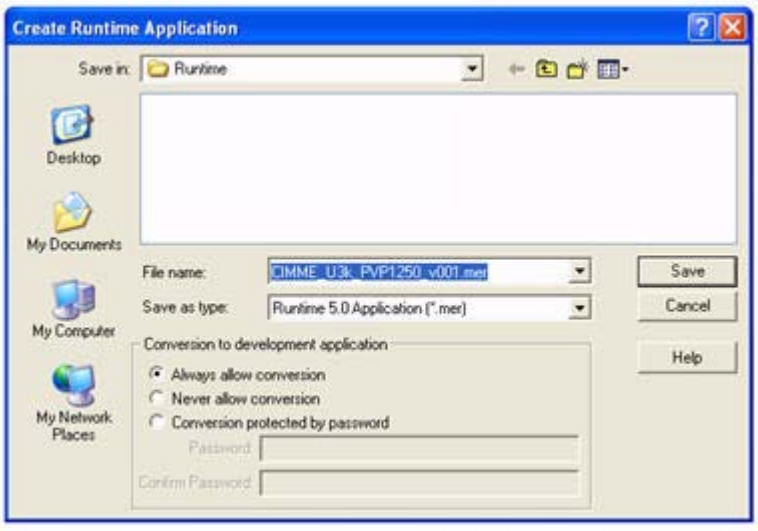
The Create Runtime Application window opens.

2. For Save as type:, select Runtime 5.0 Application (*.mer).

3. For Filename, enter a file name for the application.

   CIMME_U3k_PVP1250_v001.mer is used in this example.

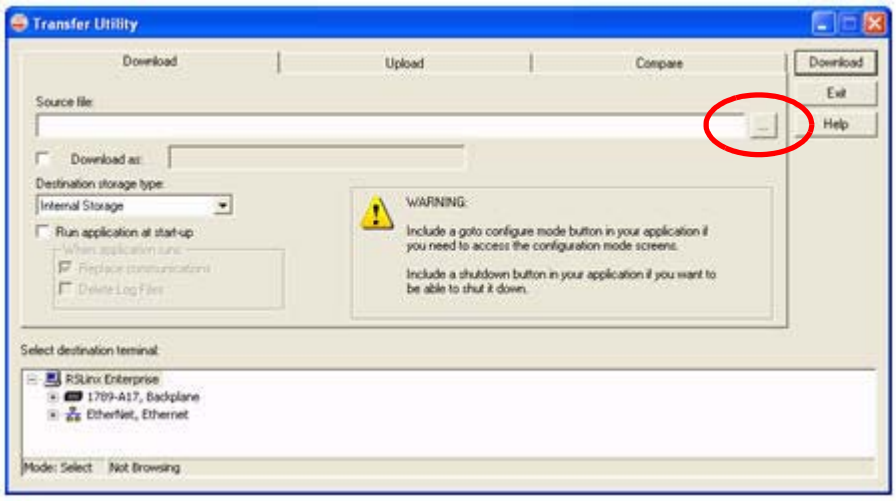
4. Click Save.



5. Click the File Transfer Utility button on the tool bar.

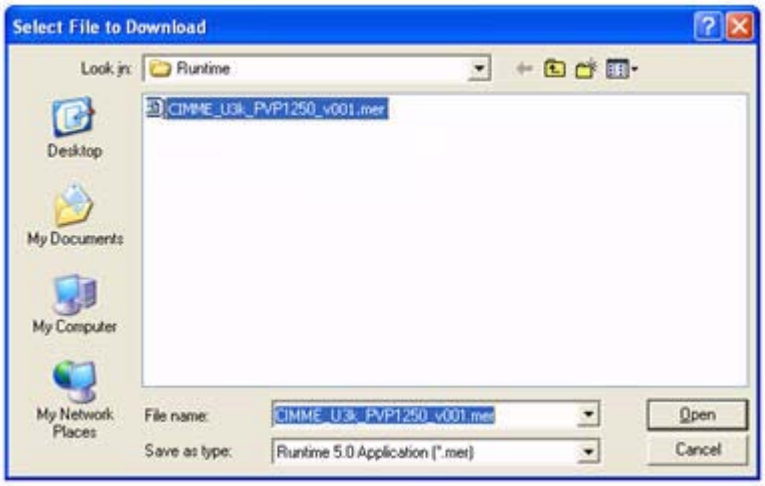
The Transfer Utility window opens.

6. Click … to browse for the runtime file.



7. Select CIMME_U3k_PVP1250_v001.mer.

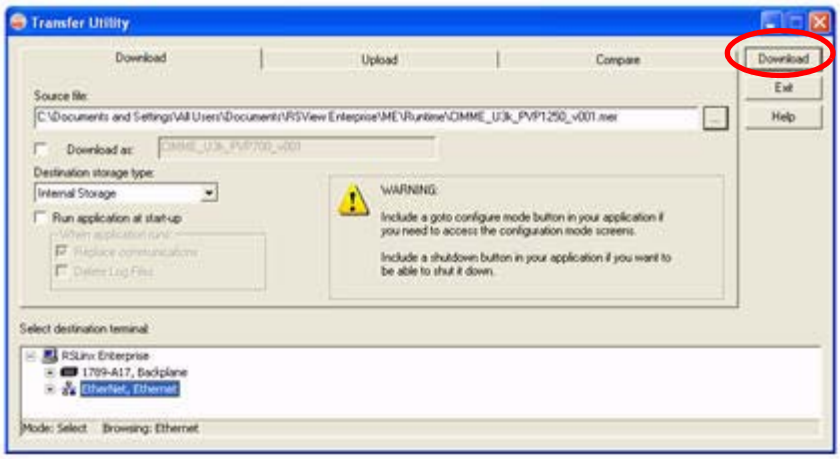
8. Click Open.



9. Browse for your PanelView Plus terminal.

10. Select Download.

    The file transfers to the PanelView Plus terminal.



11. Click OK.

12. Click Exit to close the Transfer Utility window.

13. Choose File>Close to close the application.

Run the Project on a Terminal

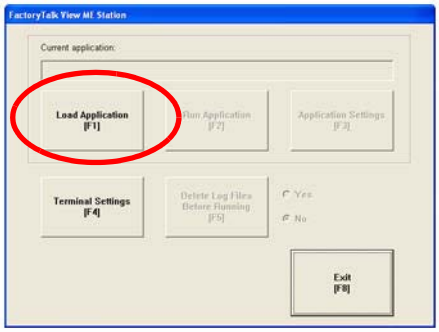
Follow these steps to run your project on the PanelView Plus terminal.

1. Apply power to the PanelView Plus terminal.

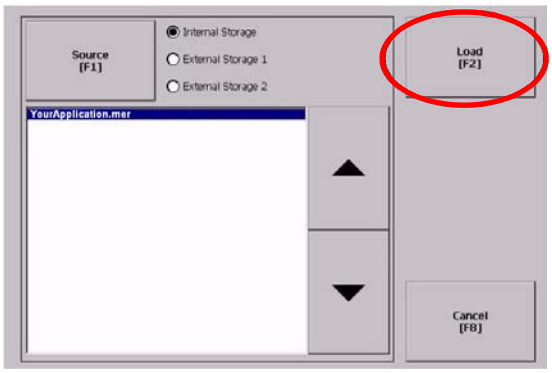
2. Connect your motion system communication network cable to your PanelView Plus terminal and personal computer.

   The FactoryTalk View ME Station window opens.

3. Click Load Application.



The Load Application window opens.

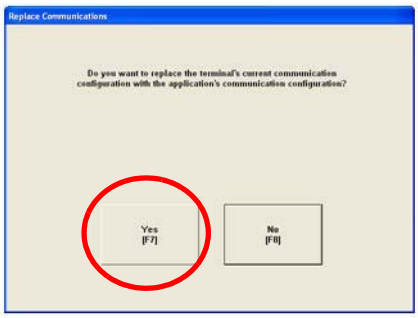


4. Scroll through the list of application files by using the up/down arrows and select the .mer file you intend to run.

   CIMME_U3k_PVP1257000_v001.mer is used in this example.

5. Click Load.

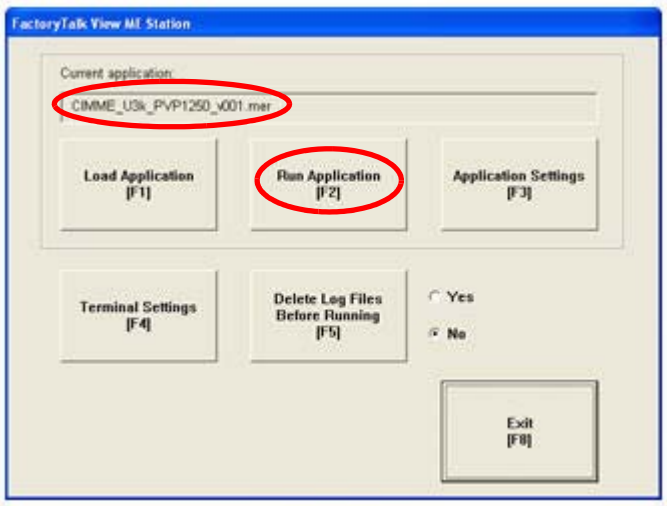
   The Replace Communications window opens.



6. Click Yes.

   If you click No, the communications settings from the project run previously will be used instead.

   The FactoryTalk View ME Station window returns.



7. Verify that the CIMME_U3k_PVP1257000_v001.mer file appears in the current application field.

8. Click Run Application.

9. Verify the functionality of the application.

Refer to Chapter 7 for a basic understanding of how to run a general motion system application.

Motion System Application Guide

In this chapter, you are guided through the pre-configured FactoryTalk View ME application that interfaces with the pre-configured Logix program that controls your base motion system. You will run your motion system in Manual mode and Auto mode, and use the built-in axis status and diagnostics.

Before You Begin

- Complete your system hardware selection. (Refer to Chapter 2.)
- Complete your system layout. (Refer to Chapter 3.)
- Complete your system wiring. (Refer to Chapter 4.)
- Complete your Logix Integration procedures (refer to Chapter 5) and download the Logix program to your controller.
- Complete your FactoryTalk View ME Integration procedures (refer to Chapter 6) and download the FactoryTalk View program to your HMI.

ATTENTION

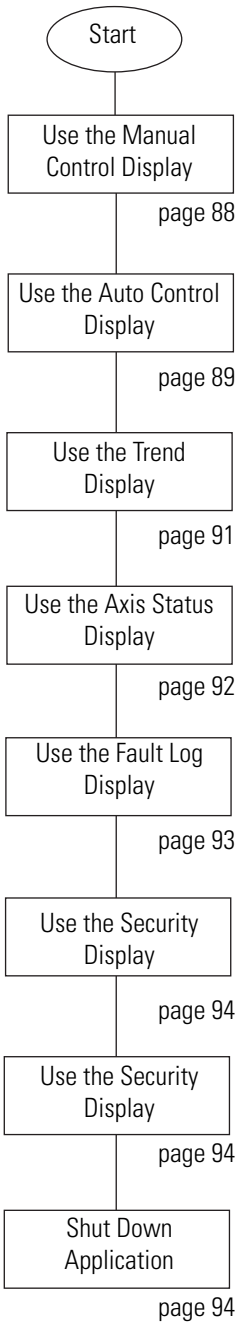
To reduce the possibility of unpredictable motor response, disconnect all loads from your motors until initial axis tuning is complete. For tuning procedure, refer to the Ultra3000 Digital Servo Drive Installation Manual, publication 2098-IN003.

What You Need

- Kinetix Accelerator Toolkit CD, publication IASIMP-SP004. For a copy of the CD, contact your local Rockwell Automation distributor or sales representative.
- Hardware installation and wiring complete, with power applied.
- Logix application file (CIML*xx*_*x*axis_v00*x*.acd) downloaded to CompactLogix controller. Controller is set to run.
- FactoryTalk View ME runtime application file (IMME_PVP*xxxx*_v00*x*.mer) downloaded to the PanelView Plus terminal. Run Application activated on terminal.
- Ultra3000 Digital Servo Drive Installation Manual, publication 2098-IN003.

Follow These Steps

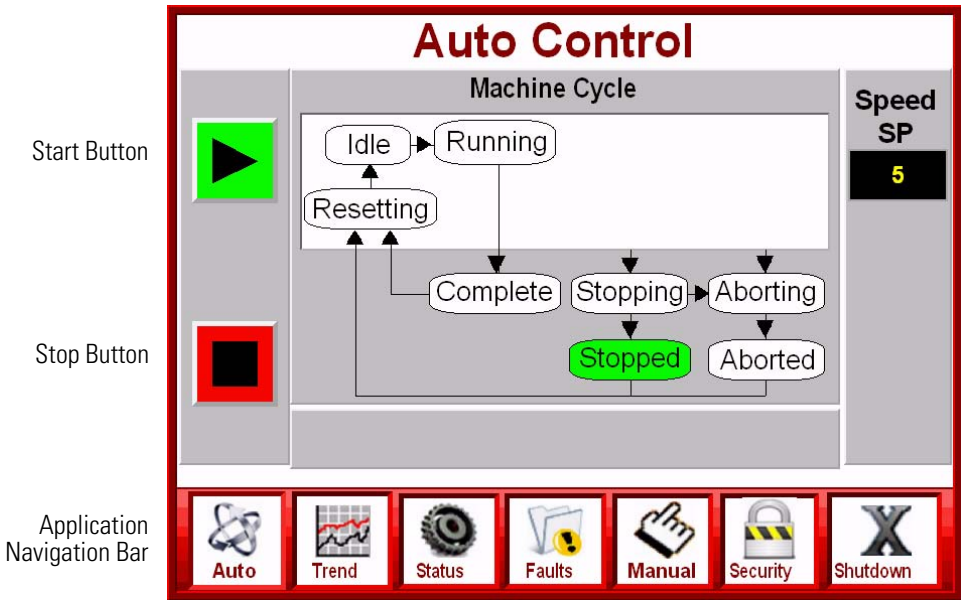
Complete the following display overview steps to run the pre-configured application and gain an understanding the general motion system operation.



Startup Display

With power applied to your CompactLogix Indexing Motion system, and the Logix controller and PanelView Plus terminal in Run mode, the Auto Control (startup) display automatically opens on your PanelView Plus terminal.

IMPORTANT If the Auto Control display is not visible or errors are reported on either the CompactLogix controller or PanelView Plus terminal, refer to previous chapters to check system wiring and configuration settings.



The Auto Control display provides general system status and state machine functions. You see this display at startup and whenever the Auto button is pressed from the Application Navigation Bar. The Application Navigation Bar, at the bottom of all displays, lets you select any application display.

At startup, the system machine state should be Stopped, indicated by the green Stopped indicator. If the system is not stopped, press the Stop button.

ATTENTION

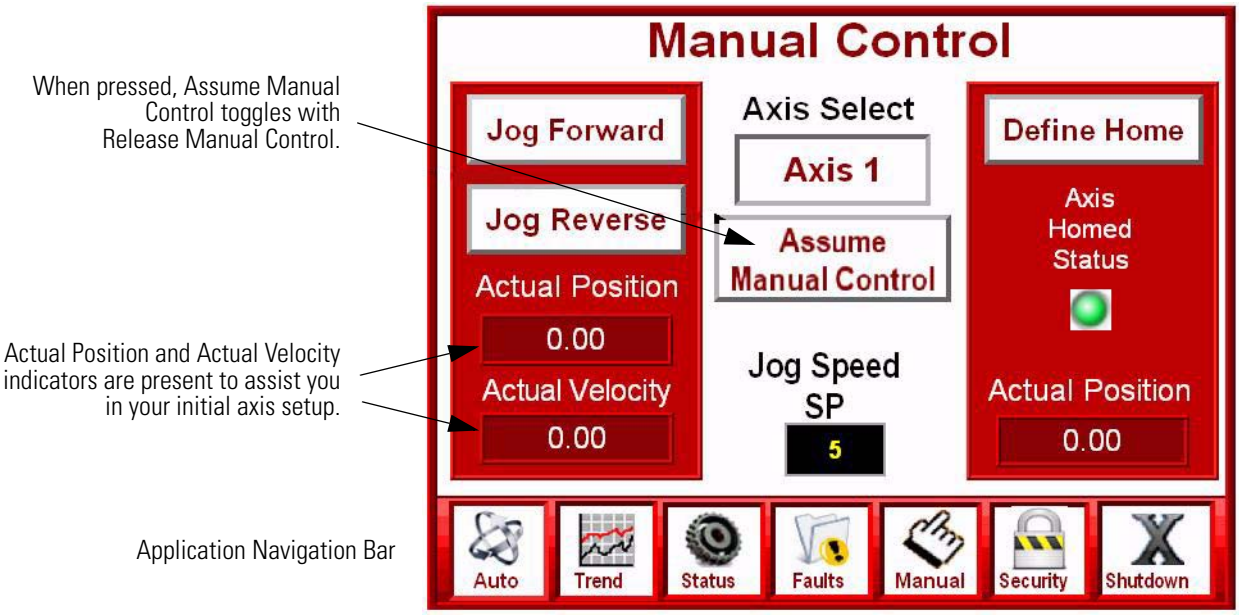
Before running any of the Auto Control (state machine) functions, run the Manual Control functions beginning on page 88.

Use the Manual Control Display

Follow these steps to home and jog the selected axis using the Manual Control display.

1. Press Manual on the Application Navigation Bar.

   The Manual Control display opens.



2. Press Assume Manual Control to provide Jog Forward, Jog Reverse, and Define Home button manual control functionality.

3. Press Release Manual Control to disable Jog Forward, Jog Reverse, and Define Home button functionality and enable Auto Control.

Change the Axis Selection

Follow these steps to select a specific axis and give it jog and home commands.

1. Press Axis Select Axis 1 in the center of the Manual Control display. The Axis Selection display opens.

2. Press Axis 2.

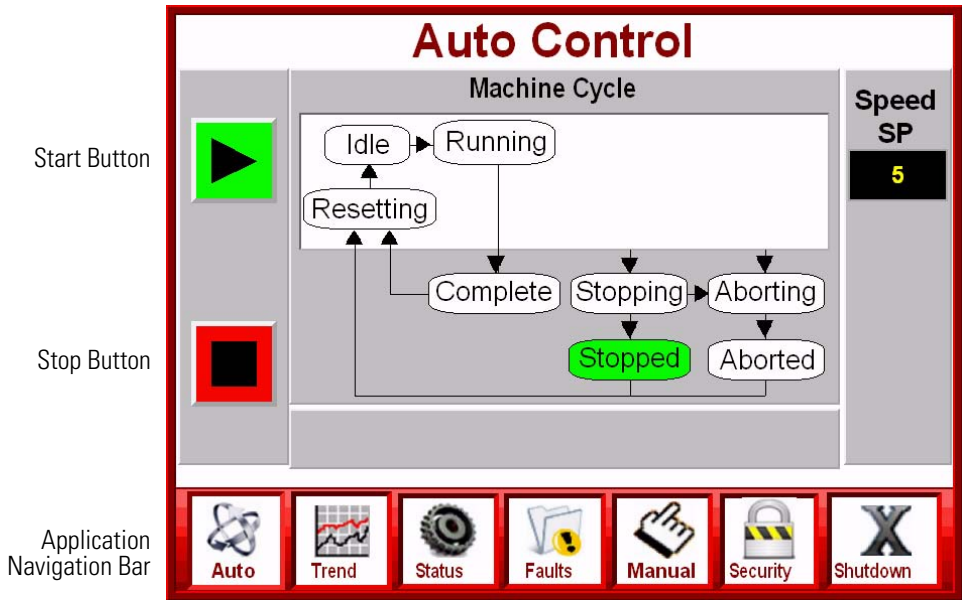
   The Axis Selection display closes, the Manual Control display returns.

3. Jog (forward/reverse) or home Axis 2 from Manual Control display.

Use the Auto Control Display

The Auto Control display lets you start, stop, hold, and restart the motion system. The state machine section provides the status of the current motion system phase state.

Press Auto on the Application Navigation Bar. The Auto Control display opens.



Start and Run State Actions

Follow these steps to start your motion system and proceed to Run state.

If	System Status	Then
The Release Manual Control button is flashing	Manual control was not released.	Go to step 1.
The (green) Stopped state moves to Resetting and then to Idle	Your system is ready to start.	Go to step 2.

1. Press Release Manual Control to release manual control.

ATTENTION

Pressing Start will cause the system to jog.

Do not press Start if motion will cause personal injury or damage to equipment.

2. Press Start.

If	System Status	Then
The (green) Stopped state moves to Resetting and then to Aborted	The system failed to reset.	Go to step 3.
The (green) Stopped state moves to Resetting and then to Idle	Your system is ready to start.	Go to step 4.

3. Check for power to drives, verify that you have provided a Drive Enable input to each of the drives and try the Start command again. Refer to the Troubleshooting section on page 115 for additional assistance.

4. Press Start again.

Stop State Actions

To stop your motion system, press Stop.

The state moves (green) from Running to Stopping and then to Stop.

ATTENTION

The Start and Stop buttons on your PanelView Plus terminal display do not replace a hardwired start/stop control circuit for safety purposes. Your motion system should also have an emergency start/stop control circuit.

Adjust the Speed

Follow these steps to adjust the relative speed of your motion system.

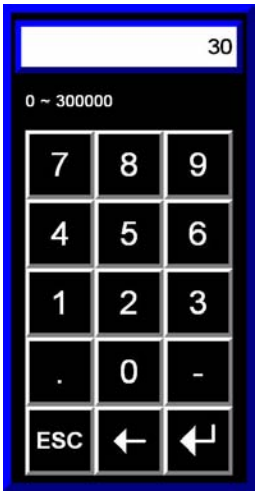
1. Press Speed.

   The numeric keypad opens.

2. Enter a new speed value from the keypad.

3. Press the Enter button.

   The keypad closes and motor speed is updated with the new value.



Enter button

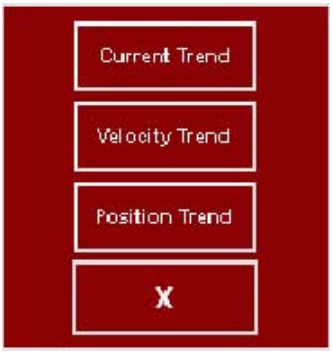
Use the Trend Display

The Trend display lets you view current, actual velocity, and actual position trends of your motion system axes over time.

Follow these steps to view torque feedback, actual velocity, and actual position trends.

1. Press Trend on the Application Navigation Bar.

   The trend selector display opens.



2. Select your trend of choice.

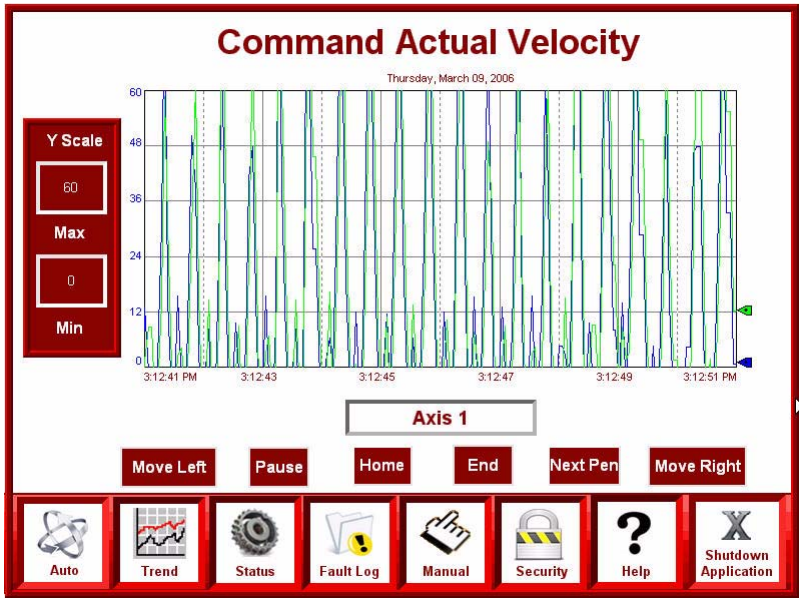
   The trend display opens.

   The Command Actual Velocity trend (shown) operates similarly to the other trend displays.

3. Press Axis 1 to view trends of other axes. (Refer to Change the Axis Selection on page 88.)

   The Axis Selection display opens and lets you change the axis trend to view as shown in the Manual Control section.

   In this example, two axes are trended, but based on your axis configuration, other axes can also be viewed.



4. Press Y-Scale Min or Max to change values.

   The numeric keypad opens. (Refer to Adjust the Speed on page 90 to view the keypad.)

5. Enter a new value and press Enter.

   The keypad closes and the Y-Scale (Min or Max) is updated with the new value.

Use the Axis Status Display

The Axis Status display shows general motion, axis, and drive status, and faults.

Follow these steps to view status and fault indicators and to select the axis.

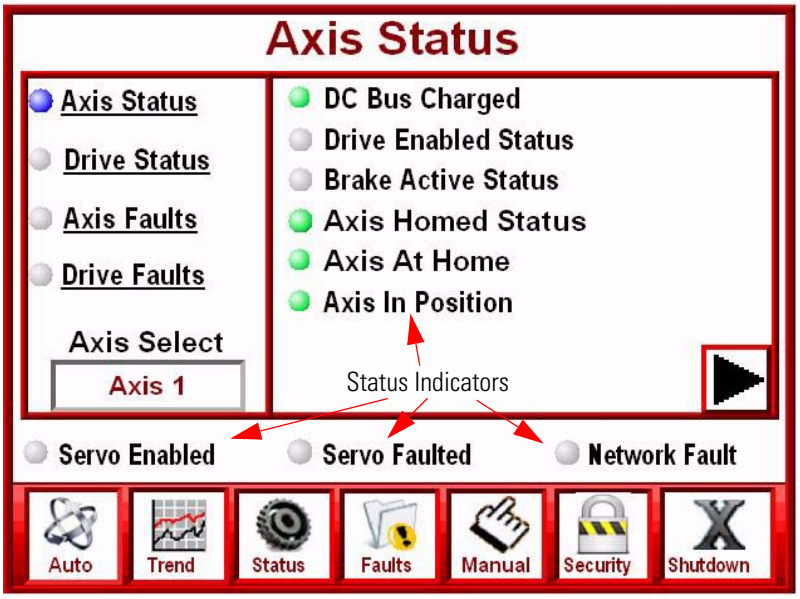
1. Press Status on the Application Navigation Bar. The Axis Status display opens.

2. Select a system Status or Fault category from the axis (left) window.

   The green indicator confirms your status/faults selection.

3. Monitor the status or fault indicators (right side and below.)

   In this example, Axis Status indicators are shown. Servo Enabled, Servo Faulted, and Network Fault status indicators are always present.



   Axis Status, Drive Status, Axis Faults, and Drive Faults indicators show the corresponding status/faults of the axis displayed on the Axis Select button.

   The ON/OFF and Faulted/Non-Faulted states are described in the tables below.

Status Indicators	ON State	OFF State
Axis Status	Green	Grey
Drive Status		

Fault Indicators	Faulted State	Non-faulted State
Module Faults	Red	Grey
Drive Faults		

4. Press Axis Select Axis (1) to select another axis for status and fault viewing. (Refer to Change the Axis Selection on page 88 for axis selection operation.)

Use the Fault Log Display

The Fault Log display lets you monitor and/or log motion group, module, axis, or drive fault events.

Follow these steps to monitor and/or log fault events.

1. Press Fault on the Application Navigation Bar.

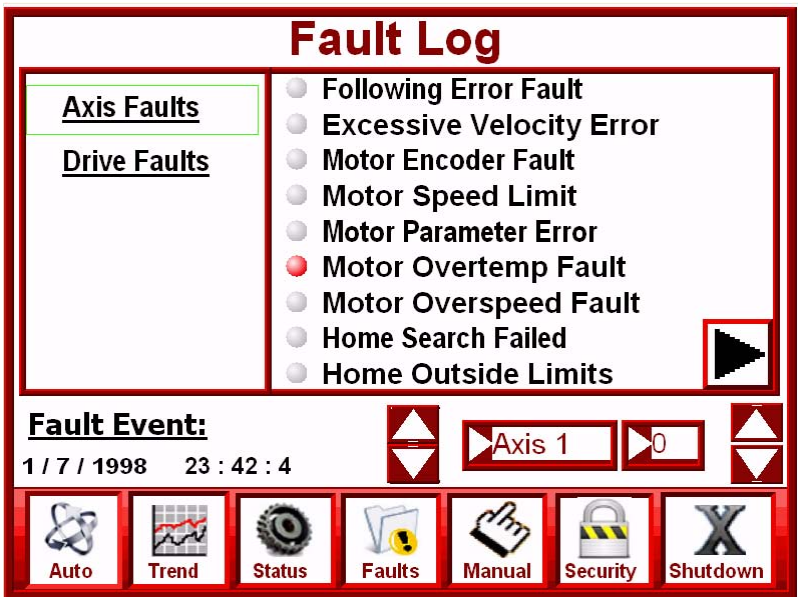
   The Fault Log display opens.

2. Select a system Fault category from the Fault window (left).

   The green indicator confirms your fault selection.

3. Monitor the Fault Indicators (right).

   In this example, Axis Fault indicators are shown. Red indicators represent a faulted state. Grey indicators represent a non-faulted state.



   The Logix controller stores the last 50 fault events for each axis. A fault event is triggered by any non-fault to fault transition for any given axis. The 50 faults are stored on a first-in/first-out basis.

   The indicators displayed correspond to the selected axis.

4. Press the up/down arrows to the left of the selected axis to change the axis.

5. Press the up/down arrows to the right of the selected axis to change the fault event.

   Fault events number 0…49. When the fault event number changes, the fault event date/time and indicators also change.

Use the Security Display

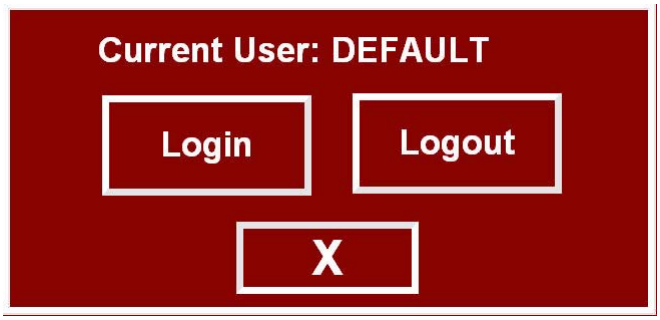
The security feature of FactoryTalk View ME lets you limit privileges to the individuals that use the FactoryTalk View ME application. Refer to FactoryTalk View Machine Edition User's Guide, Volume 1, publication VIEWME-UM004, for more information.

The security display adds login and logout functions to the application. User names and passwords have not been setup in the FactoryTalk View ME application files, but using FactoryTalk ViewStudio software, you can edit the base application files to add user names and passwords for your specific needs.

1. Press Security on the Application Navigation Bar.

   The Current User window opens.

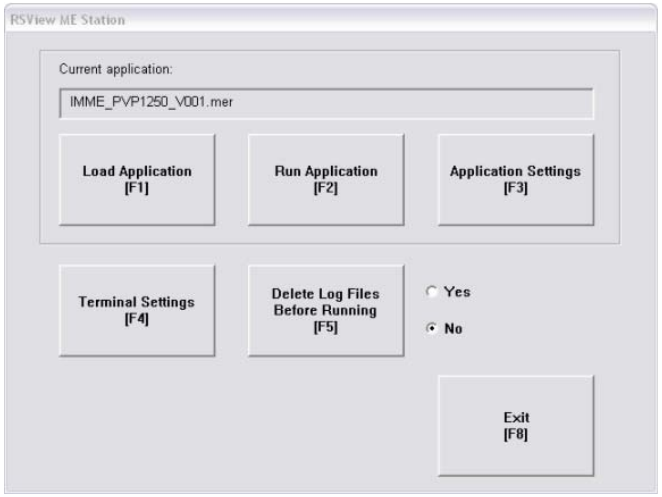
2. Press Login.



Shut Down Application

To shut down the application, press Shutdown Application on the Application Navigation Bar. The FactoryTalk View ME application shuts down.

The PanelView Plus terminal returns to the FactoryTalk View ME Station display.



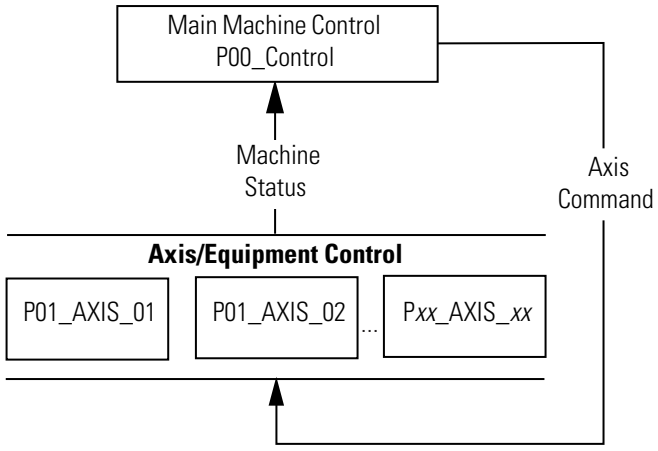
CompactLogix Base Program Overview

The pre-configured CompactLogix program is a Rockwell Automation solution that helps machine builders and end users streamline their motion control programming. This application template provides a basis for using motion control, understanding the principles of state programming, and creating a consistent program structure.

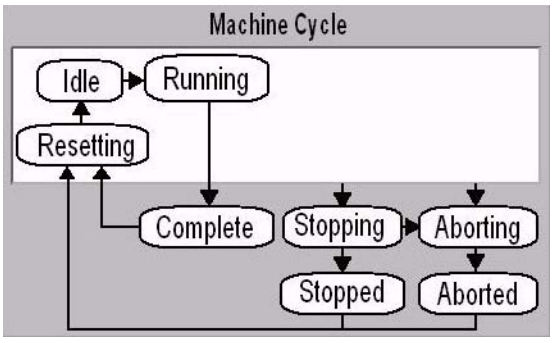
The CompactLogix program template does the following:

- Incorporates a simple state machine sequencing programming.
- Provides a base structure, making it easier to write, use, and manage the code for your machine or equipment.
- Streamlines the development of application programs.
- Can be optionally sequenced with PhaseManager for S-88 compatibility (L3x only), but PhaseManager is not required.

Basic Program Flow



Automatic Machine Cycle Diagram

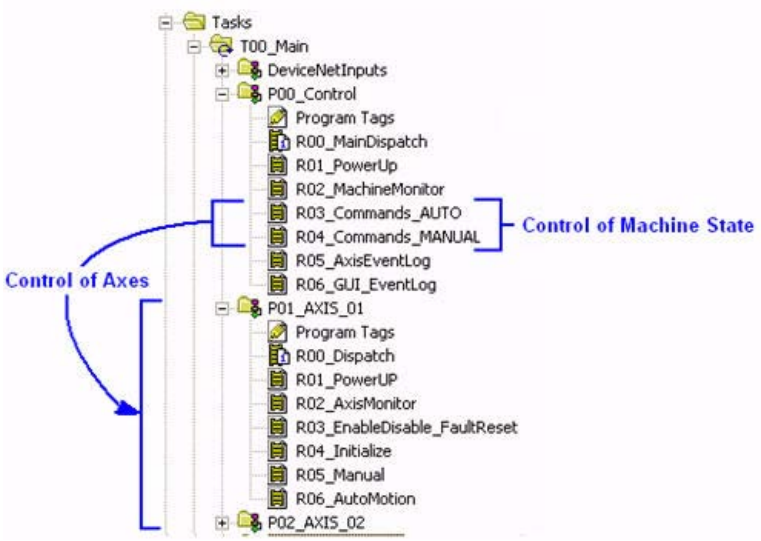


TIP If you are familiar with the full S-88 functionality of the Kinetix Accelerator Toolkit sample code, note that the CompactLogix Indexing Motion Accelerator Toolkit provides a reduced set of functionality. It does not use PhaseManager.

Main Machine Control (P00_Control)

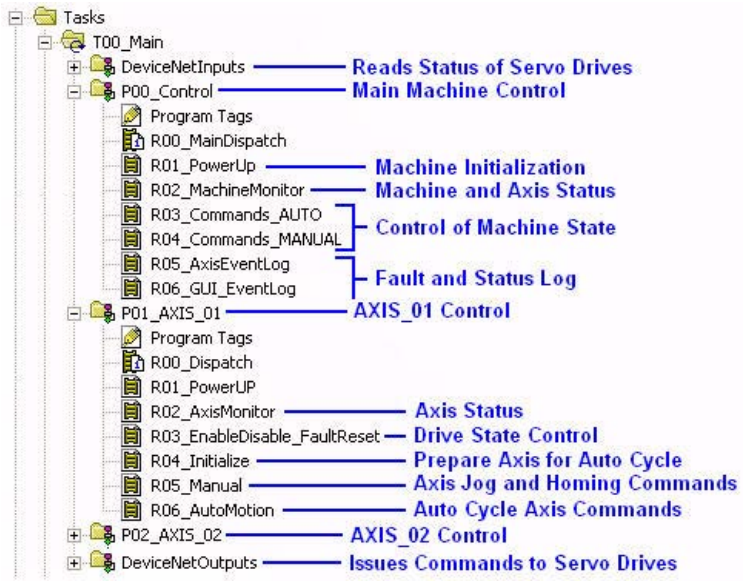
All machine control is initiated from the P00_Control program within the T00_Main task. The sequencing of the machine state (Resetting, Idle, Running, Stopping, or Stopped) is handled in routines in this main control program. This is done based on user input from the HMI and machine conditions.

Main Machine Control Flow



The R03_Commands_AUTO routine controls the automatic cycle of the machine and the R04_Commands_MANUAL routine controls the manual functions of the servo axes.

Overall Program Flow



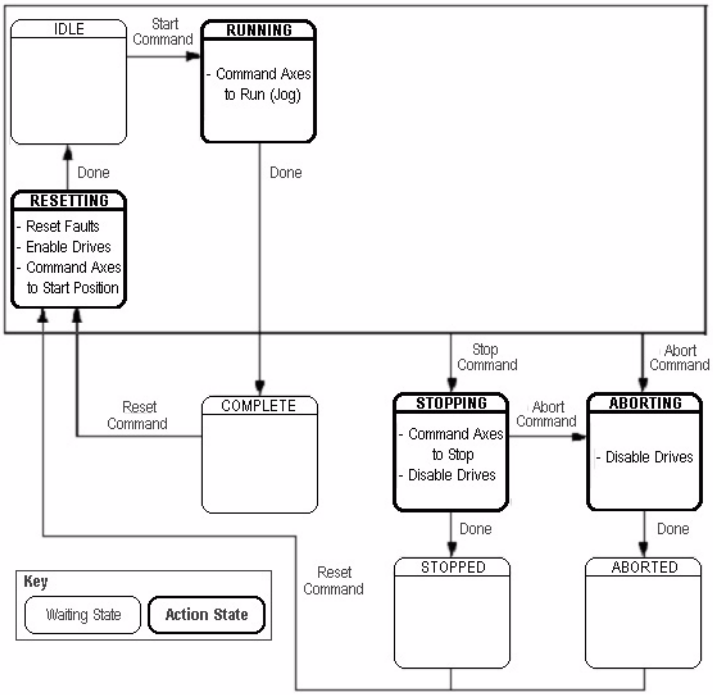
The automatic cycle and the manual cycle are controlled by a state sequencer. The sequencer has an index register (for example, AutoCycle.StepIndex) that can only be at one value at a time, so the states of the machine are unique. The sequencer changes states based on the commands and conditions of the machine.

In the P00_Control rung example below, if the conditions (not manual, auto cycle idle state, and user start request) are met, a machine start command is initiated.

Start Command Rung

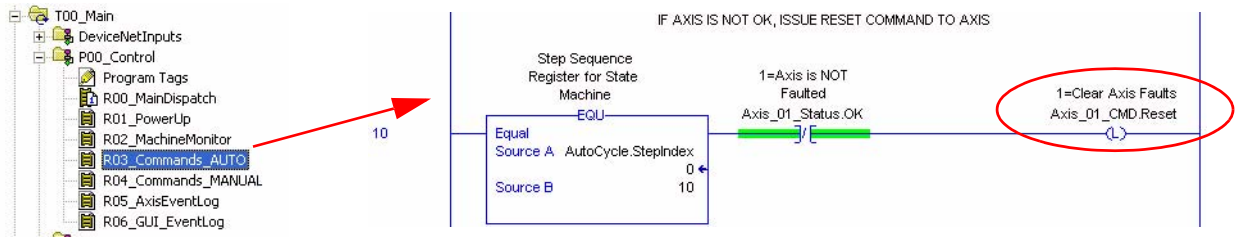
There is logic in the main machine control P00_Control program for the automatic cycle as well as manual machine control.

Automatic Machine Cycle Commands

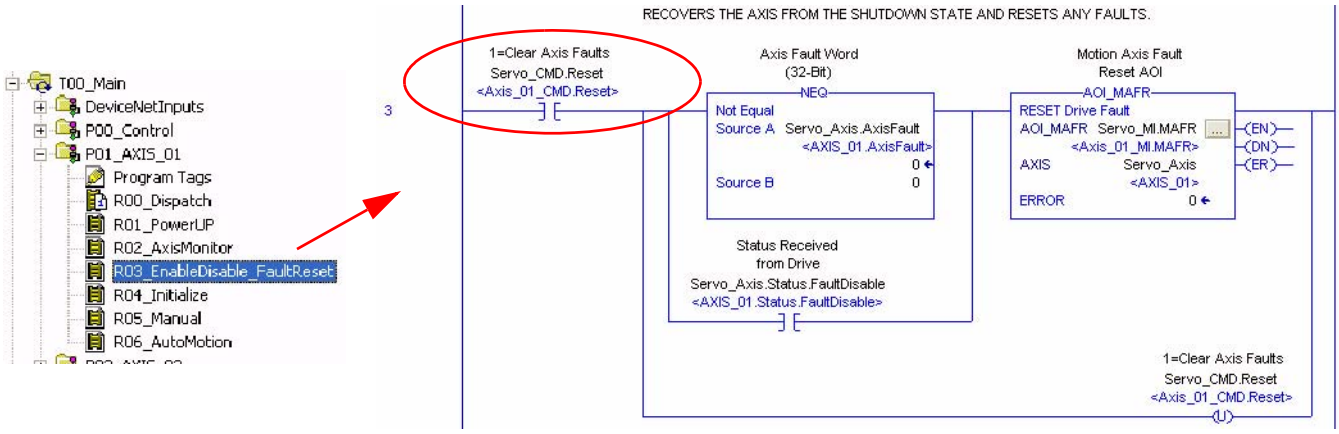


The diagram above shows the automatic cycle flow provided in the application template. As the commands are issued (Reset, Start, Stop, or Abort) by the user or the application logic, the action items shown inside the Action States are issued from the P00_Control routine to each of the P*xx*_AXIS_*xx* programs. The actual axis commands (Fault Reset, Enable, Jog, Stop, etc.) exist in the routines of the P*xx*_AXIS_*xx* programs and not in the P00_Control program.

Command Issued



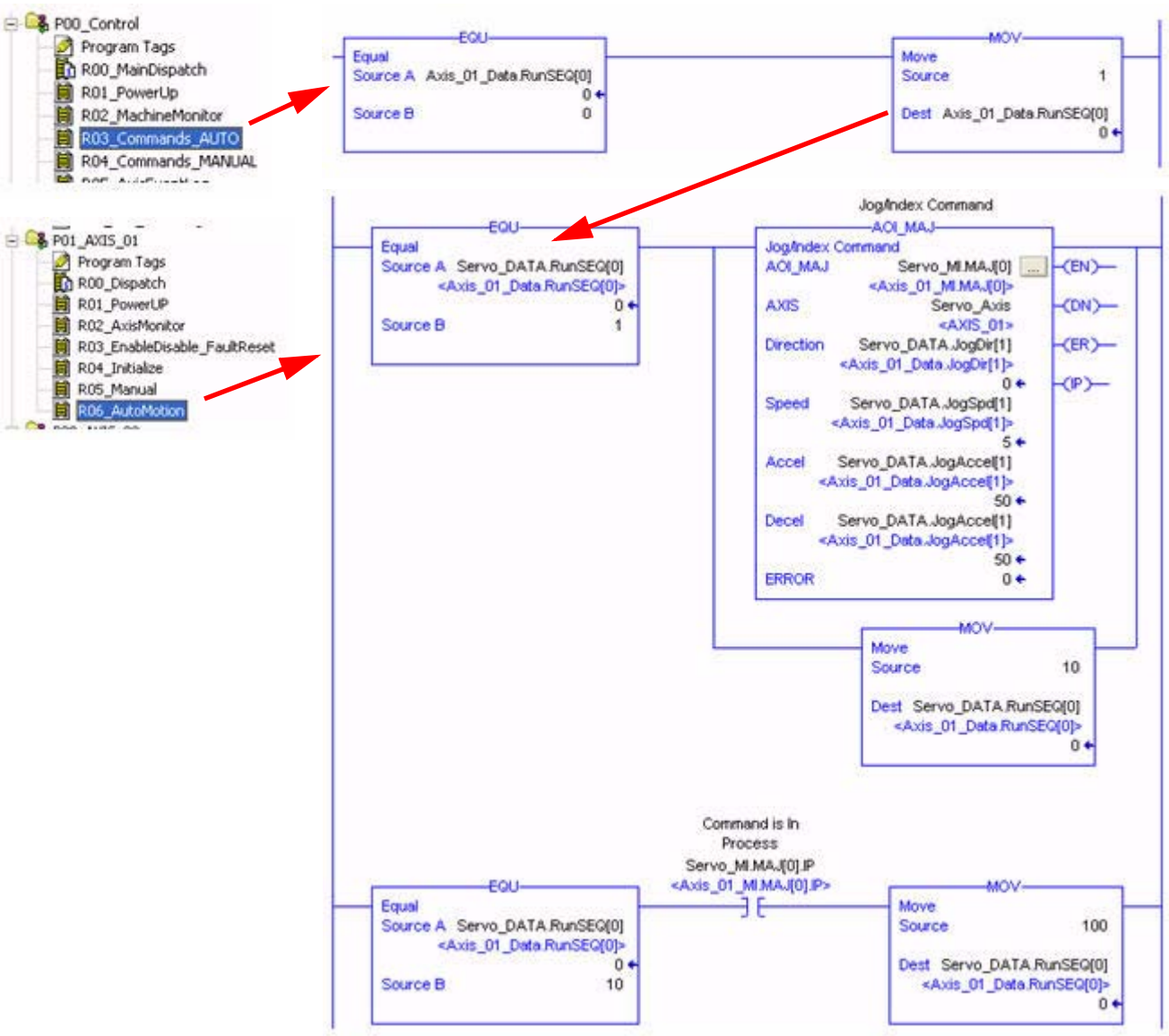
Action Taken



Should any of these command action states fail to complete, the application template issues an abort command which stops the running cycle and disables the servo drives.

Axis/Equipment Control

The individual axis actions are controlled based on the machine state. Any of the states will issue commands that will initiate actions programmed within routines in the individual axis programs. In the rungs of code below, within the Auto-Running phase state logic, a sequence word is set to a value of 1 to initiate a run sequence in P01_AXIS_00…R06_AutoMotion routine.



In this case, a Jog command is issued on AXIS_01.

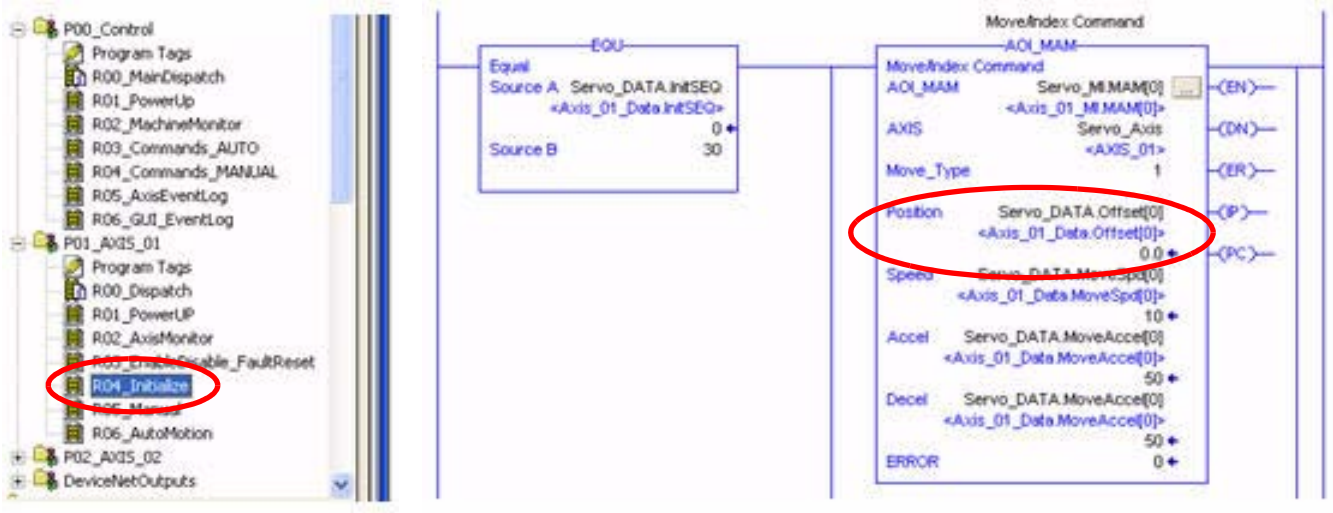
Add Your Application Code

Follow these steps to add application code to each of your P*xx*_AXIS_*xx* programs.

1. In RSLogix 5000 software, expand the Explorer window to gain access to Tasks.

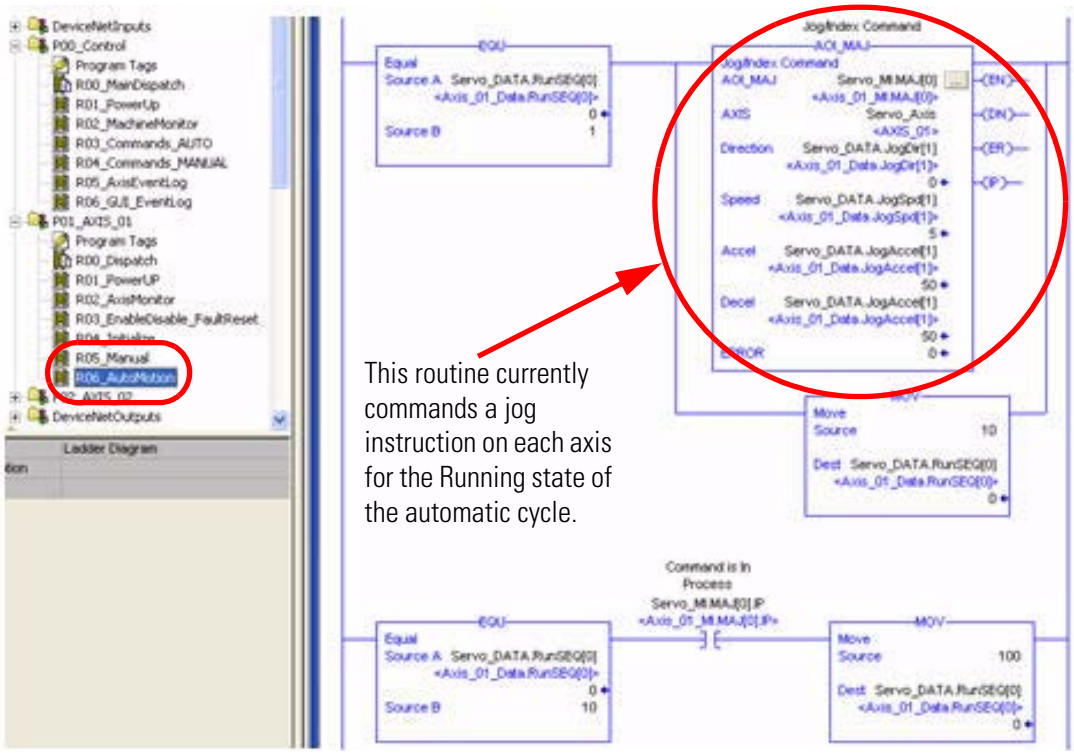
   Refer to Main Machine Control (P00_Control) on page 96 to see how that is done.

2. Modify rung 4 of the R04_Initialize routine to move your axes to their required starting positions.



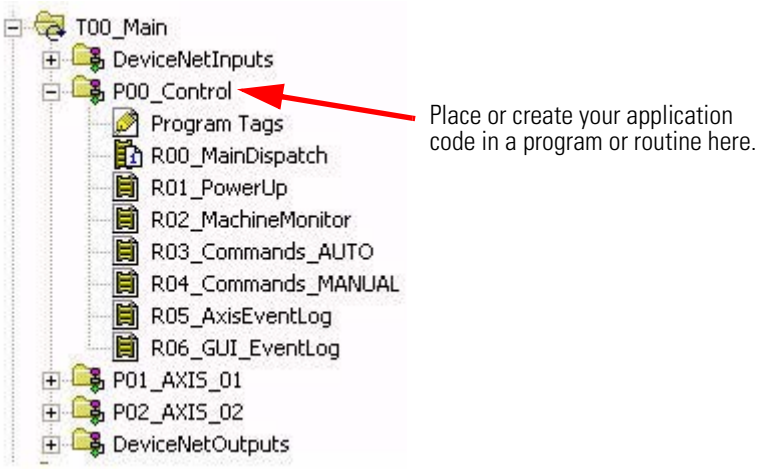
3. Replace rungs 2 and 3 of the R06_AutoMotion routine with code that signifies your axes are ready for the Running state of your automatic cycle.

These rungs can also be replaced with an MOV instruction that simply increments each Servo_DATA.RunSEQ[0] register to a value of 100, which signifies that the axis is ready for the automatic cycle.



4. You may also choose to place your automatic cycle code in a new program or routine.

You can even paste an existing program into the T00_Main task or a routine into the P00_Control program.



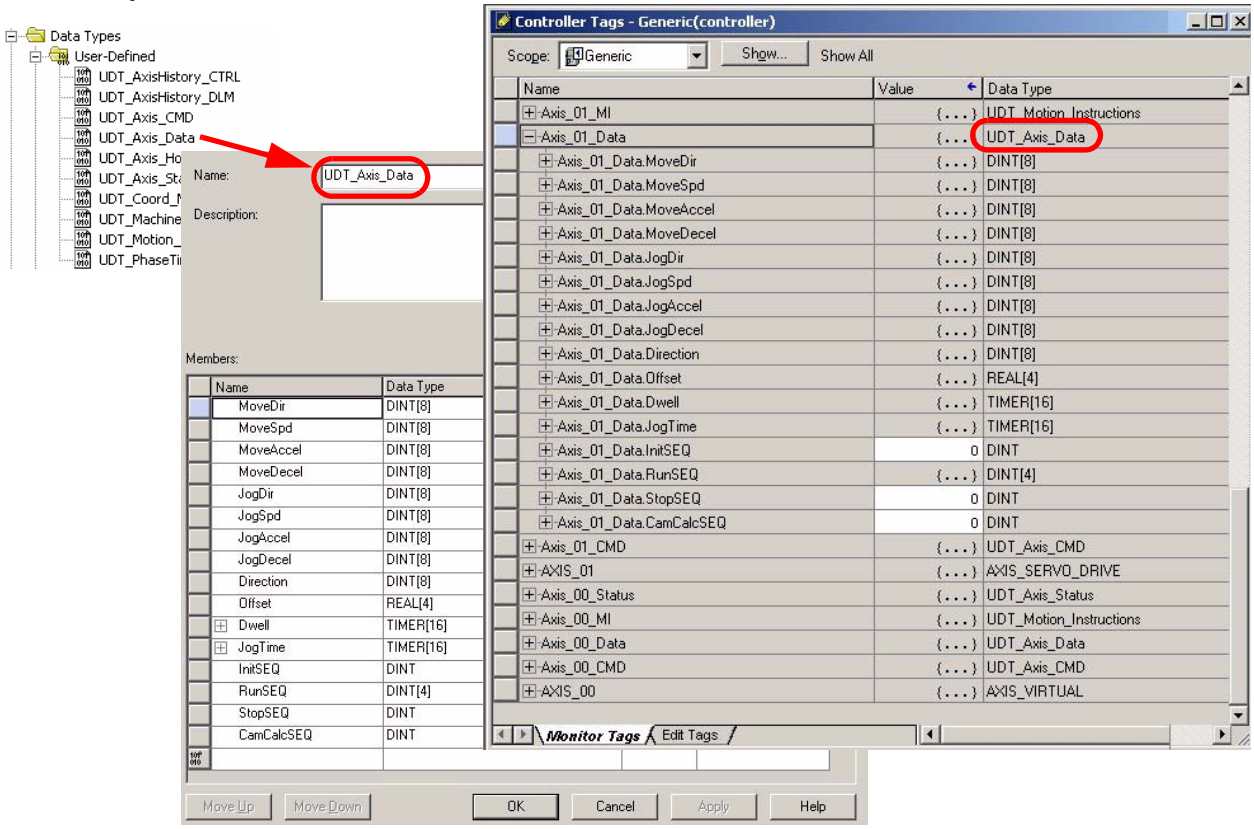
TIP Handshake the appropriate machine state tags (Idle, Running, or Stopped, for example) or machine condition tags (from the GenericMachine_COND) with your existing code as needed.

User-defined Data Types

The pre-configured Logix program uses pre-configured user-defined data types (UDT). These are structures that organize data, status information, and commands for machine process and equipment.

For example, this pre-configured UDT stores all the data for an axis, including speeds, accels, decels, direction, and sequencers. A tag structure is created for each axis based on this data type.

Axis Data UDT Example



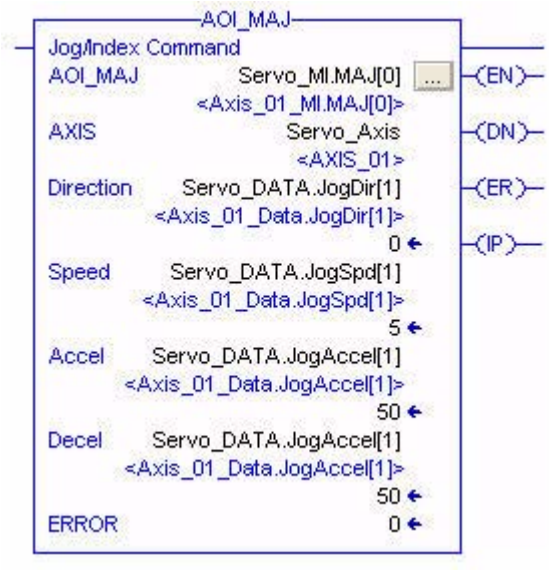
A UDT provides these advantages:

- One tag contains all of the data related to a specific aspect of your system. This keeps related data together and easy to locate, regardless of its data type.
- Each individual piece of data (member) gets a descriptive name. This automatically creates an initial level of documentation for your logic.
- You can use the data type to create multiple tags with the same data layout.

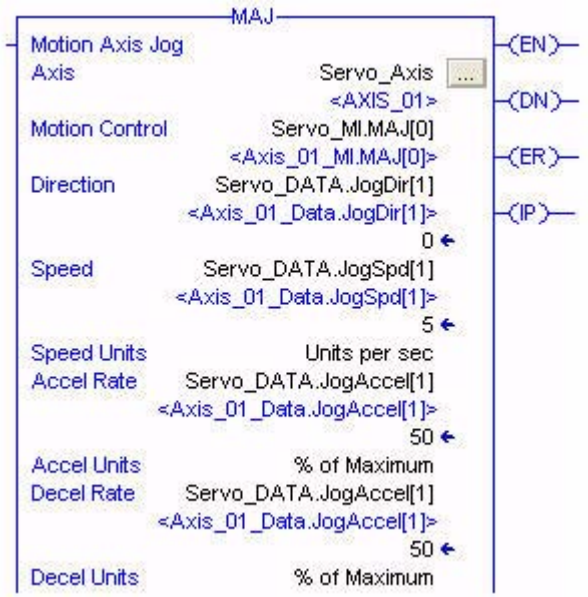
Add-On Instructions

The real power and advantage of the CompactLogix Indexing Motion Accelerator Toolkit is the use of Add-On Instructions in RSLogix 5000 software to simplify the way that motion is commanded to the Ultra3000 Indexing servo drives. These Add-On Instructions look and program very similar to the integrated motion instructions for SERCOS motion systems, so the learning curve for using them is minimized.

Add-On Instruction for Axis Control



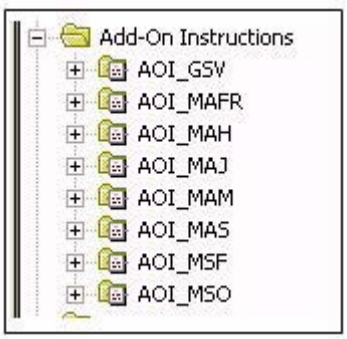
Add-On Jog Instruction



Logix Integrated Motion Instruction

You can see that the Add-On Instructions are very similar to the integrated motion instructions. The ERROR word of the Add-On Instruction aids in troubleshooting an axis. Press F1 with the instruction highlighted in RSLogix 5000 software to instantly decode the error value. This toolkit supports the following motion instructions when used with the Ultra3000 Indexing servo drive on DeviceNet.

- Get System Value (AOI_GSV)
- Motion Axis Fault Reset (AOI_MAFR)
- Motion Axis Home (AOI_MAH)
- Motion Axis Jog (AOI_MAJ)
- Motion Axis Move (AOI_MAM)
- Motion Axis Stop (AOI_MAS)
- Motion Servo Off (AOI_MSF)
- Motion Servo On (AOI_MSO)



PhaseManager

PhaseManager integrates equipment phases into your controller logic. An equipment phase makes it easier to write, use, and manage the code for your machine or equipment.

IMPORTANT PhaseManager is not required for using this toolkit. If your system is required to meet the ISA-88 Machinery Standard, you can easily alter the sample logic application files provided with this toolkit to use PhaseManager. By default, the phases are placed in the Unscheduled Programs and Phases folder of the project and are not being used.

Refer to *Appendix B* of this manual for assistance with changing from the state machine logic to one controlled by PhaseManager.

The Logix program template contains two equipment phases.

- PZ_GenericMachine_AUTO_PM - Controls the machine when in auto mode
- PZ_GenericMachine_MANUAL_PM - Controls the machine when in manual mode

An equipment phase is similar to a program in that it runs in a task and has a set of routines and tags. It differs from a program in that the equipment phase uses a state model and does one activity of your machine or equipment, such as auto or manual.

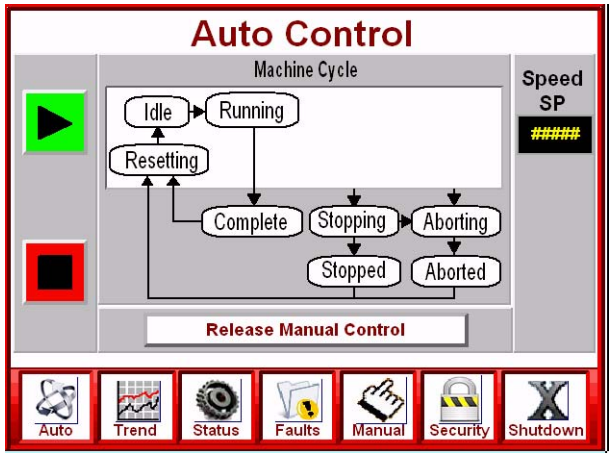
Refer to the PhaseManager User Manual, publication LOGIX-UM001, and the Kinetix Accelerator Toolkit Quick Start Guide, publication IASIMP-QS002, publication for more information about PhaseManager.

Notes:

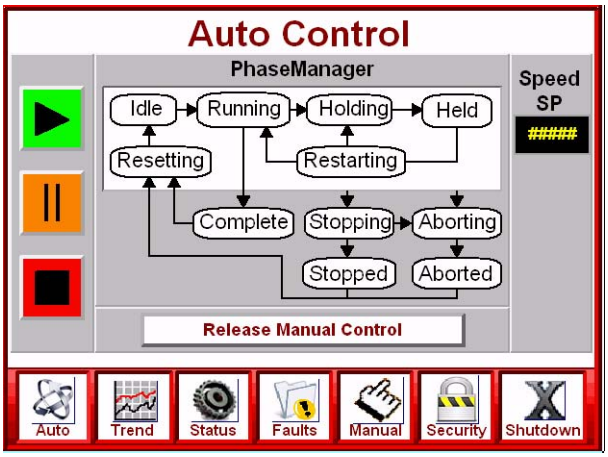
PhaseManager for S-88 Users

The pre-configured CompactLogix program template is driven by a simple state machine, as shown in Appendix A. If your system must comply to ISA-88 (S-88), Rockwell Automation offers PhaseManager as an embedded state machine controller that runs in the firmware of the CompactLogix controller. The CompactLogix program template already includes the code necessary to convert your system from the state machine version to a version that is driven by PhaseManager.

Follow the steps in this section to convert your program template and your operator interface screens from the simple state machine version to a version that uses PhaseManager and the S-88 state model shown below.



Simple State Machine



S-88 Machine with PhaseManager

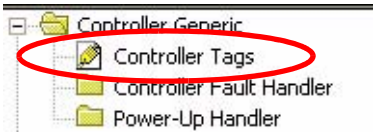
Making Changes to the Program Template

Follow these steps to convert the CompactLogix program template from a simple state machine to a version that uses PhaseManager.

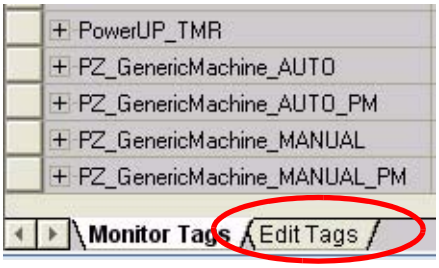
Modify Your Controller Tags

1. Open the Logix application file that you selected in Chapter 5.

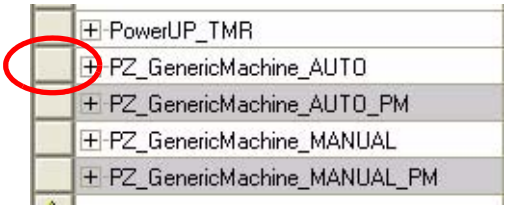
2. Double-click on Controller Tags in the controller organizer. You will need to delete two controller tags.



3. Select the Edits Tags tab and scroll down to the tags shown below.



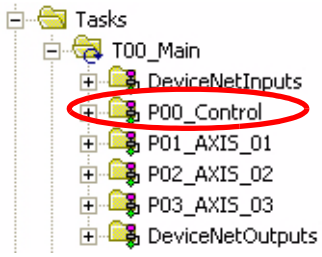
4. Click on the box to the left of PZ_GenericMachine_Auto, then right-click and select Delete.



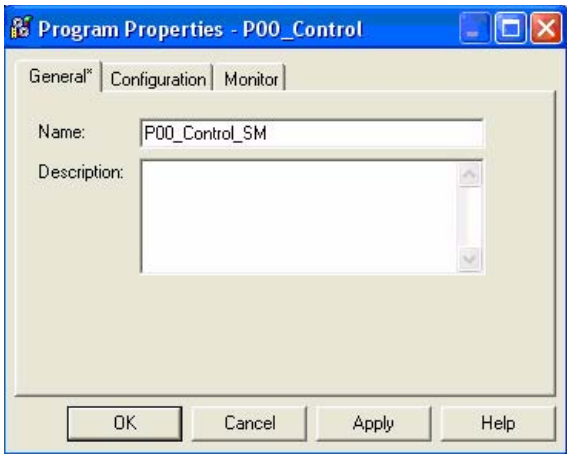
5. Similarly, click on the box to the left of PZ_GenericMachine_Manual, then right-click and select Delete.

Replace the State Machine Program

1. In the Project Explorer, right-click on the P00_Control program and select Properties.

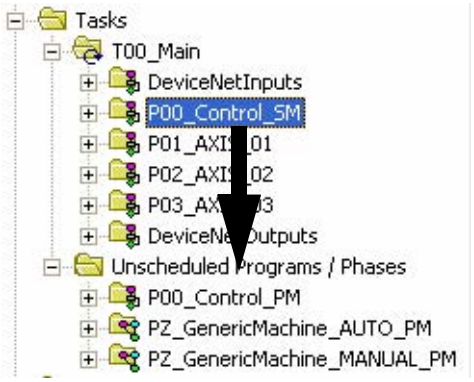


2. Change the name to P00_Control_SM.

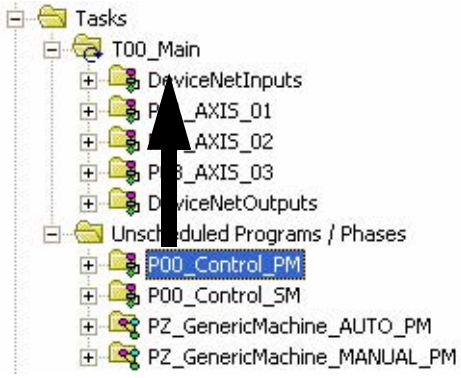


3. Click OK.

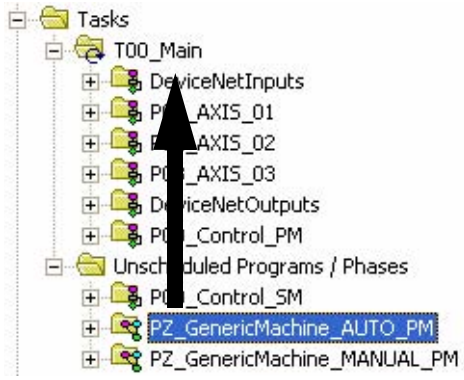
4. Drag the P00_Control_SM program to the Unscheduled Programs folder.



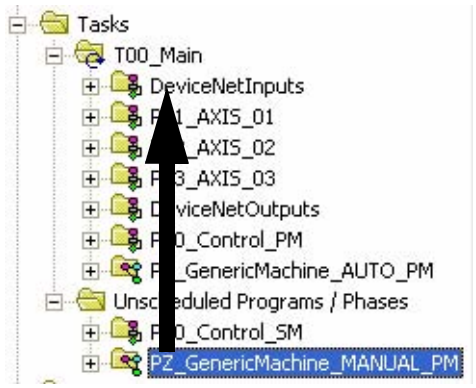
5. Drag the P00_Control_PM program to the T00_Main task folder.



6. Drag the PZ_GenericMachine_AUTO_PM Phase to the T00_Main task folder.



7. Drag the PZ_GenericMachine_MANUAL_PM Phase to the T00_Main task folder.



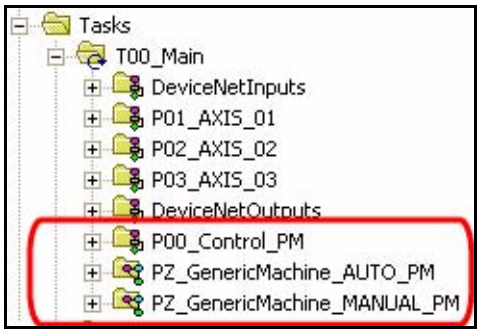
8. In the Project Explorer, right-click on the P00_Control_PM program and select Properties.

9. Change the name to P00_Control and press OK.

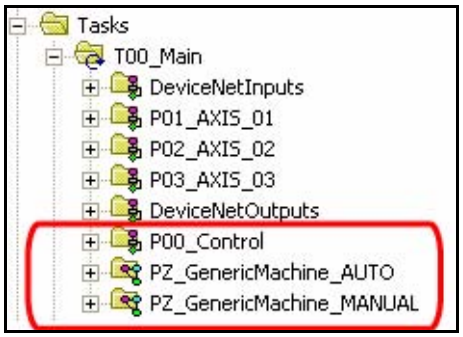
10. Similarly, rename the PZ_GenericMachine_AUTO_PM phase to PZ_GenericMachine_AUTO.

11. Also rename the PZ_GenericMachine_MANUAL_PM phase to PZ_GenericMachine_MANUAL.

Before



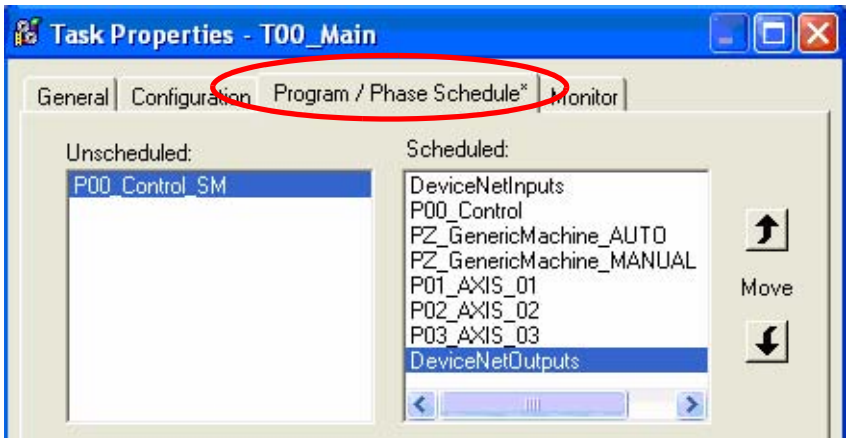
After



Reschedule Programs in T00_Main

1. Right-click on T00_Main and select Properties.

2. Click the Program/Phase Schedule tab.

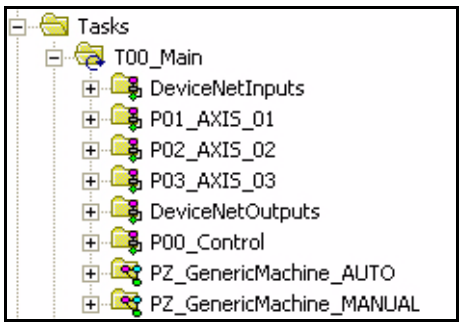


3. In the Scheduled list, select an item that is out of order and use the Move selector buttons until the list looks like the one in the 'After' list in step 5 below.

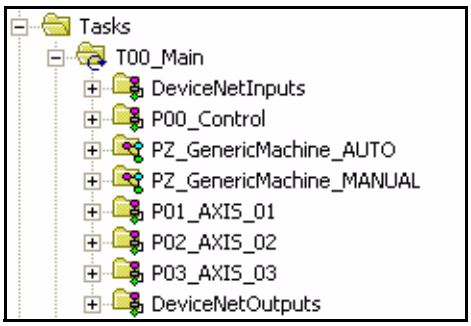
4. Click OK.

5. Verify your program scheduling as shown below.

Before



After



Your application logic now uses PhaseManager and the S-88 state model. Continue on with the steps below to change your operator interface screens.

Making Changes to Operator Interface Screens

Follow these steps to convert the FactoryTalk operator interface screen templates from a simple state machine to a version that uses PhaseManager and the S-88 state model.

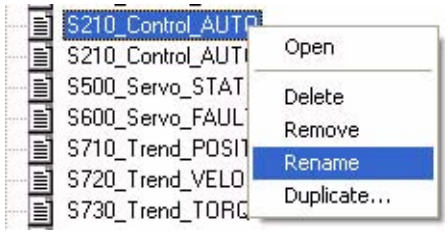
Replace the Auto Screen Display

1. Open FactoryTalk View Studio and the Machine Edition application file that you selected in Chapter 6.

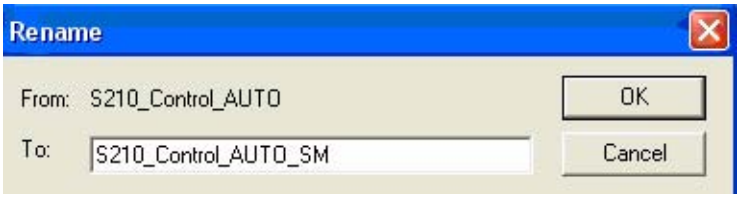
2. In the application organizer, expand Displays.

3. Locate the S210_Control_AUTO display.

4. Right-click on it and select Rename.



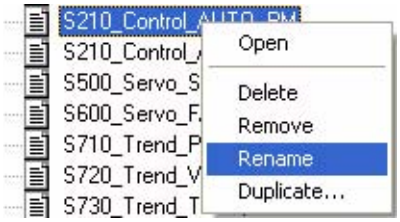
5. Change the name of the display to S210_Control_AUTO_SM.



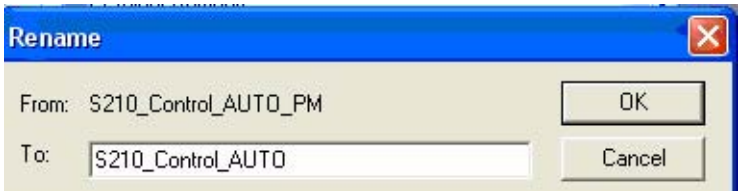
6. Click OK.

7. Locate the S210_Control_AUTO_PM display.

8. Right-click on it and select Rename.

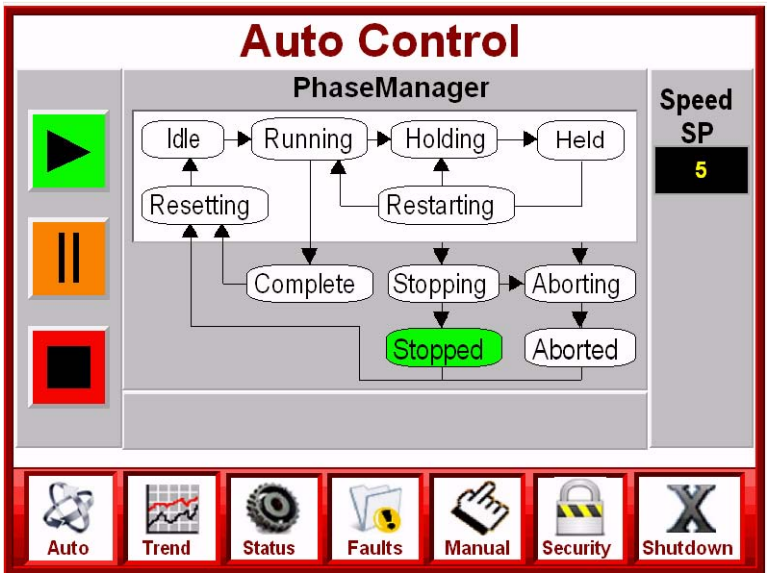


9. Change the name of the display to S210_Control_AUTO.



10. Click OK.

Your operator interface now displays the S-88 state model of PhaseManager on the Auto Control screen.



You may now download your application logic to your CompactLogix controller and the operator interface screens to your HMI, following the steps in Chapter 5 and Chapter 6 respectively.

Notes:

Troubleshooting

This appendix provides troubleshooting information for the logic provided in the application template only.

- Troubleshooting information for the manual cycle starts on this page.
- Troubleshooting information for the automatic cycle starts on page 122.

For assistance with	Refer to this manual
Drive faults and fault codes	Ultra3000 Digital Servo Drive Installation Manual, publication 2098-IN003
Network faults and fault codes	DeviceNet Modules in Logix5000 Control Systems User Manual, publication DNET-UM004

Troubleshooting the Manual Cycle

Follow these steps for assistance with problems experienced during use of the manual cycle of the CompactLogix program template.

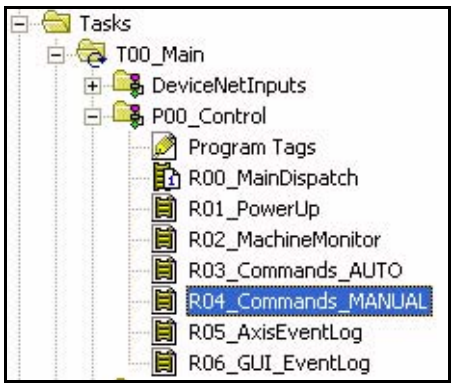
Determine Where the Program Fails

The first step in troubleshooting the code within application template is to determine where the program fails or stops. The manual cycle is controlled by a state machine. The current state of this state machine is indicated by the value in the controller tag ManualCycle.StepIndex. Perform the following steps to determine where the program is failing.

TIP You must be online with the CompactLogix controller in the Run Mode.

Your HMI also must be running in order to issue the commands to the controller.

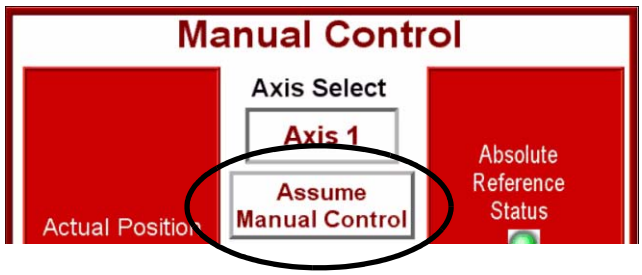
1. Expand the P00_Control program and open the R04_Commands_MANUAL routine.



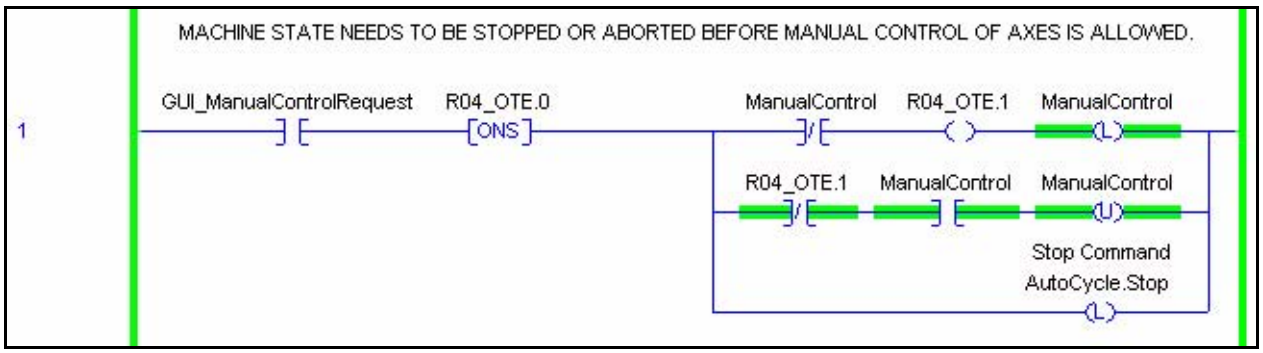
2. Use the Navigation Banner in the HMI to open the Manual Control screen.

3. Select the axis that are you are attempting to control.
Refer to Chapter 7 in this manual if you need assistance.

4. Press Assume Manual Control on the HMI screen.

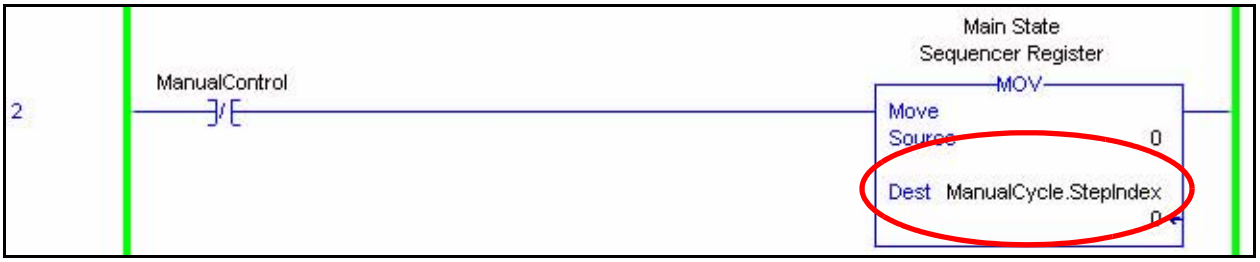


5. Observe rung 1 of the R04_Commands_MANUAL routine and verify that the ManualControl tag is latched. If not, make sure that your controller is in Run Mode, verify that the HMI is communicating properly with the controller, and verify that the automatic cycle is stopped.



6. Issue the command that you feel is failing to execute, such as the Jog Forward command on the HMI screen. Press and hold this button while you perform step 7…step 8 **including resulting steps**.

7. Observe rung 2 of the R04_Commands_MANUAL routine and carefully note what value is in the ManualCycle.StepIndex register.



8. Use the table below to determine where the cycle is stopping and what action to take next.

If ManualCycle.StepIndex =	The current state is:	Take this action:
0	Stopped	Go to Correct Manual Cycle Problem: Reset Command Is Not Commanding Any Action.
10	Resetting	Go to Correct Manual Cycle Problem: ManualCycle.StepIndex Stops at 10.
20	Resetting	Go to Correct Manual Cycle Problem: ManualCycle.StepIndex Stops at 20
200	Running	Go to Correct Manual Cycle Problem: ManualCycle.StepIndex Stops at 200.

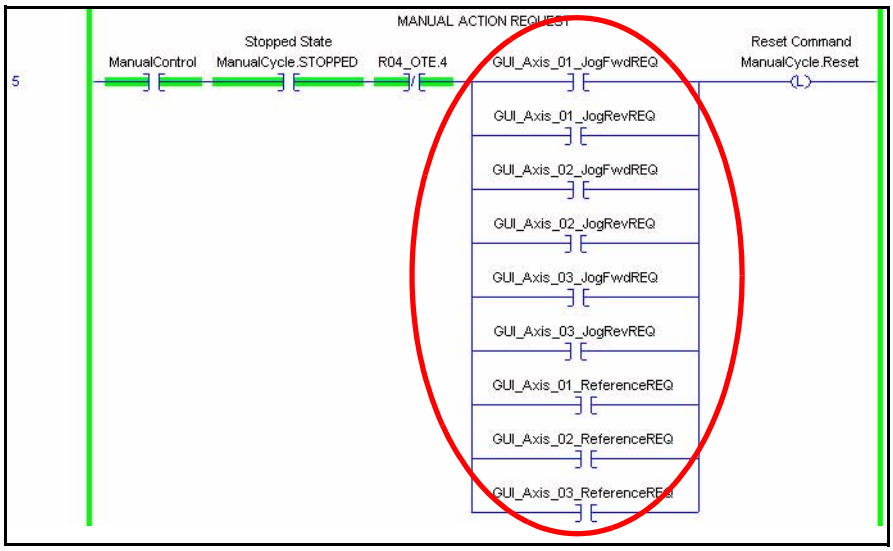
Correct Manual Cycle Problem: Reset Command Is Not Commanding Any Action

The reset command is not commanding any action. Perform the following steps to correct this condition.

1. Observe the logic on rung 5 of the R04_Commands_MANUAL routine.

2. Verify that one of the manual actions is being requested on this rung from the HMI. (Note that the ManualCycle.STOPPED tag may not be active if the reset has been commanded.)

3. If not, make sure that your controller is in Run Mode, and that the HMI is communicating properly with the controller.



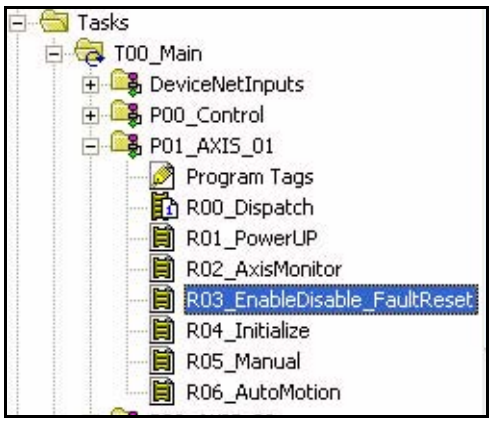
Correct Manual Cycle Problem: ManualCycle.StepIndex Stops at 10

If the ManualCycle.StepIndex stops at 10, the Axis_*nn*_CMD.Reset command is failing to clear the faults on the servo drive and the resetting state is not completing. Perform the following steps to correct this condition.

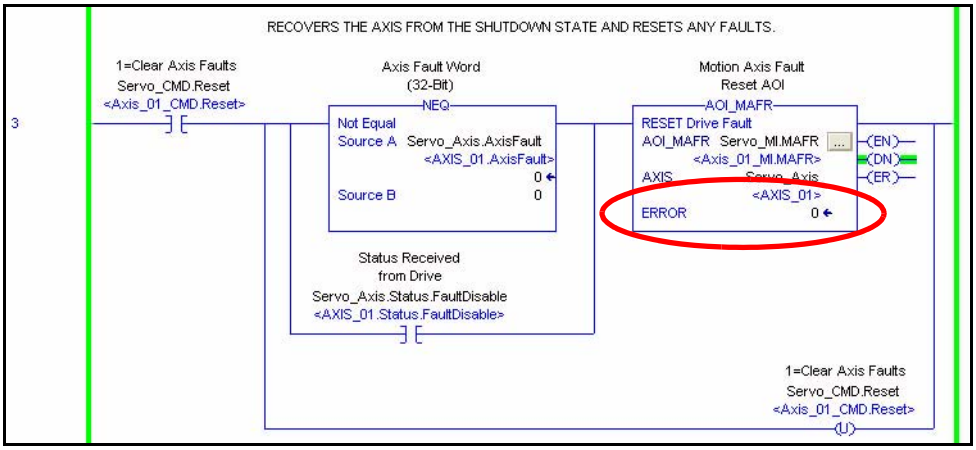
1. Observe the logic that begins at rung 14 of the R04_Commands_MANUAL routine.

2. Scroll down through the subsequent rungs and identify which drive is not setting the Axis_ *nn*_Status.OK bit and expand the associated P*nn*_AXIS_*nn* program.

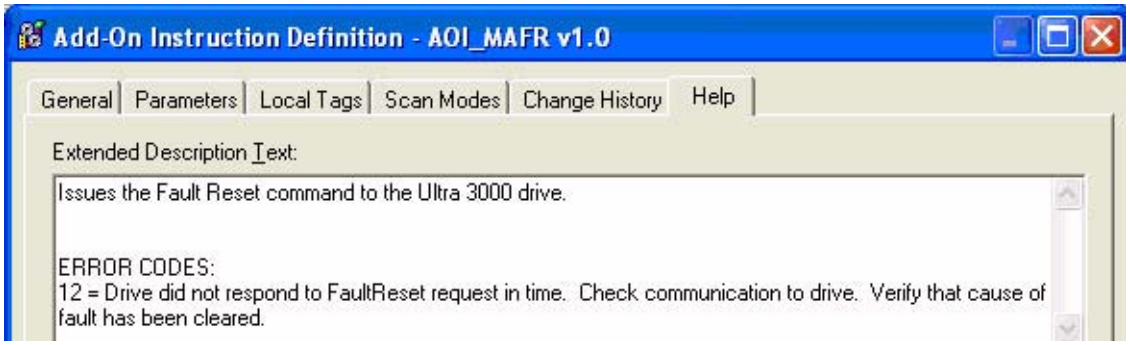
3. Open the R03_EnableDisable_FaultReset routine for this axis.



4. Move to rung 3 of this routine and note the value of the ERROR word shown on the AOI_MAFR instruction.



5. Click on the AOI_MAFR instruction and press the F1 key for assistance with the error code.


Add-On Instruction Definition - AOI_MAFR v1.0
General
Parameters
Local Tags
Scan Modes
Change History
Help
Extended Description Text:
Issues the Fault Reset command to the Ultra 3000 drive.
ERROR CODES:
12 = Drive did not respond to FaultReset request in time. Check communication to drive. Verify that cause of fault has been cleared.

6. Follow the instructions shown for the associated ERROR CODE and execute the manual command from the HMI again.

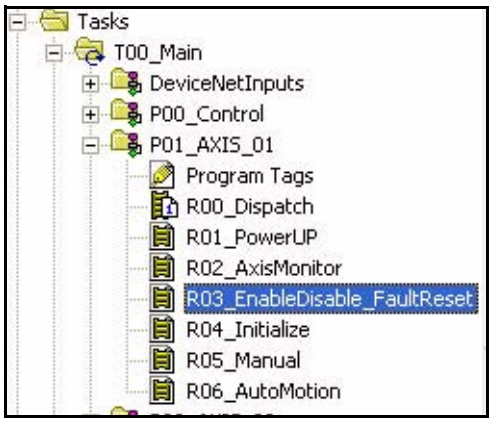
Correct Manual Cycle Problem: ManualCycle.StepIndex Stops at 20

If the ManualCycle.StepIndex stops at 20, the Axis_ *nn*_CMD.Enable command is failing to enable the servo drive and the resetting state is not completing. Perform the following steps to correct this condition.

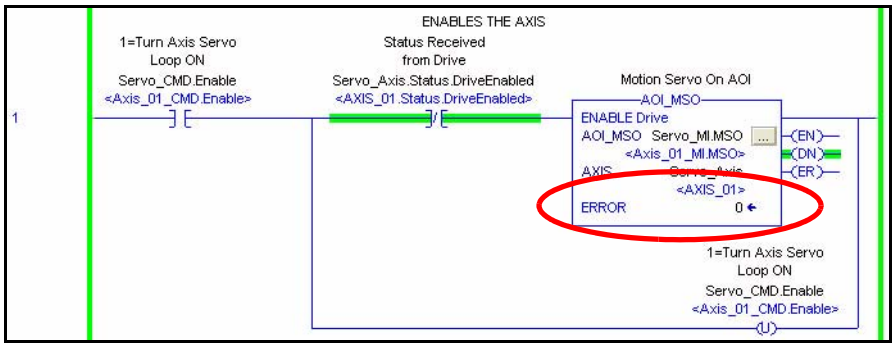
1. Observe the logic that begins at rung 14 of the R04_Commands_MANUAL routine.

2. Scroll down through the subsequent rungs and identify which drive is not setting the Axis_*nn*_Status.Enabled bit and expand the associated P*nn*_AXIS_*nn* program.

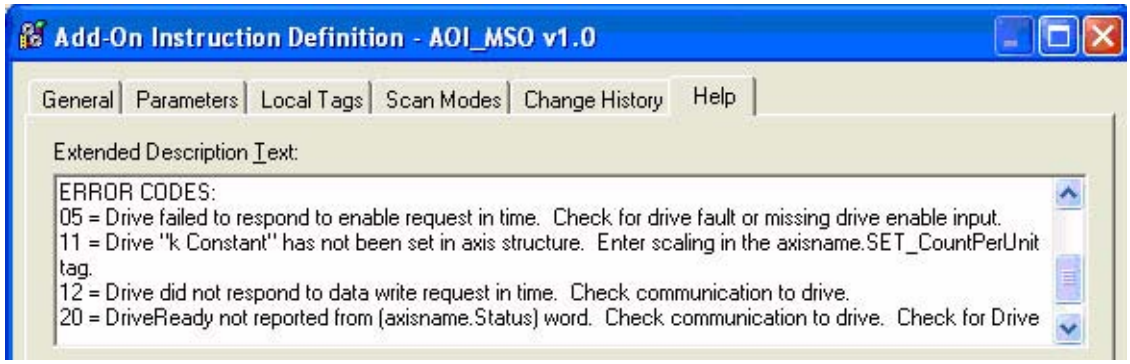
3. Open the R03_EnableDisable_FaultReset routine for this axis.



4. Move to rung 1 of this routine and note the value of the ERROR word shown on the AOI_MSO instruction.



5. Click on the AOI_MSO instruction and press the F1 key for assistance with the error code. You may need to scroll down to find your error code.

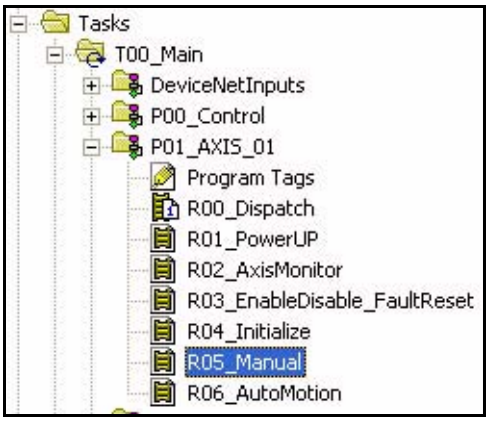

Add-On Instruction Definition - AOI_MSO v1.0
General
Parameters
Local Tags
Scan Modes
Change History
Help
Extended Description Text:
ERROR CODES:
05 = Drive failed to respond to enable request in time. Check for drive fault or missing drive enable input.
11 = Drive "k Constant" has not been set in axis structure. Enter scaling in the axisname.SET_CountPerUnit tag.
12 = Drive did not respond to data write request in time. Check communication to drive.
20 = DriveReady not reported from (axisname.Status) word. Check communication to drive. Check for Drive

6. Follow the instructions shown for the associated ERROR CODE and execute the manual command from the HMI again.

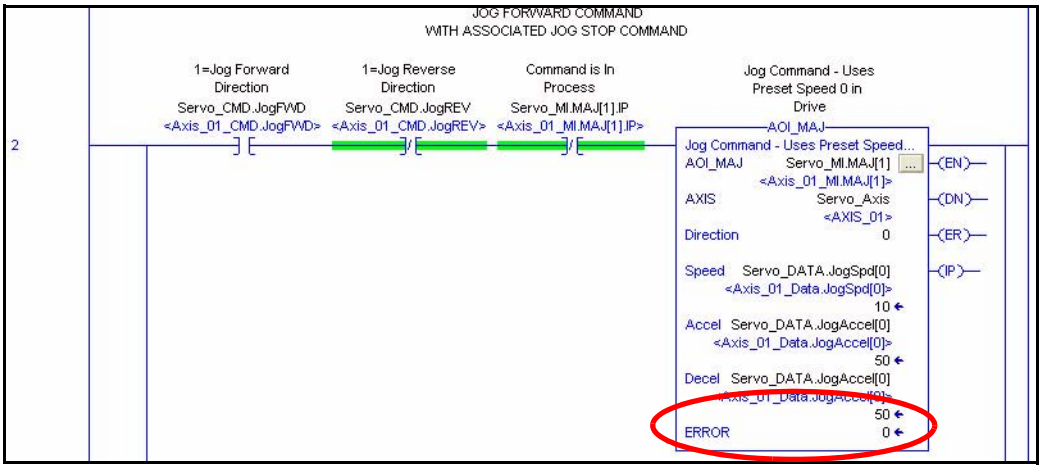
Correct Manual Cycle Problem: ManualCycle.StepIndex Stops at 200

If the ManualCycle.StepIndex stops at 200, the Jog or Define Home command is failing to execute.

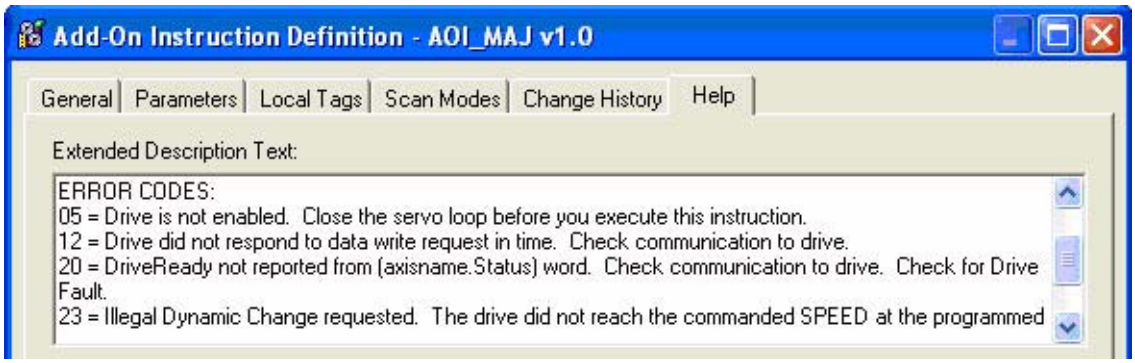
1. Open the R05_Manual routine for the failed axis.



2. Move to rung 2 of this routine and note the value of the ERROR word shown on the AOI_MAJ instruction.



3. Click on the AOI_MAJ instruction and press the F1 key for assistance with the error code. You may need to scroll down to find your error code.


Add-On Instruction Definition - AOI_MAJ v1.0
General
Parameters
Local Tags
Scan Modes
Change History
Help
Extended Description Text:
ERROR CODES:
05 = Drive is not enabled. Close the servo loop before you execute this instruction.
12 = Drive did not respond to data write request in time. Check communication to drive.
20 = DriveReady not reported from (axisname.Status) word. Check communication to drive. Check for Drive Fault.
23 = Illegal Dynamic Change requested. The drive did not reach the commanded SPEED at the programmed

4. Follow the instructions shown for the associated ERROR CODE and execute the manual command from the HMI again.

Troubleshooting the Automatic Cycle

Follow these steps for assistance with problems experienced during use of the automatic cycle of the CompactLogix program template.

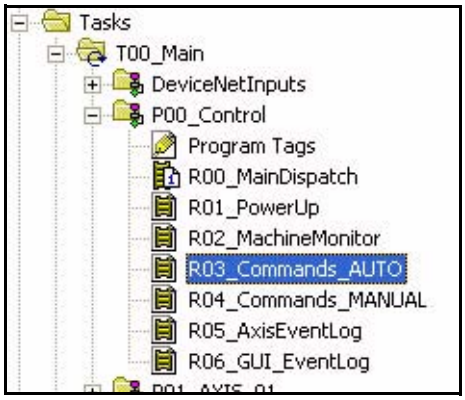
Determine Where the Program Fails

The first step in troubleshooting the code within application template is to determine where the program fails or stops. The automatic cycle is controlled by a state machine. The current state of this state machine is indicated by the value in the controller tag AutoCycle.StepIndex.

TIP You must be online with the CompactLogix controller in the Run Mode.

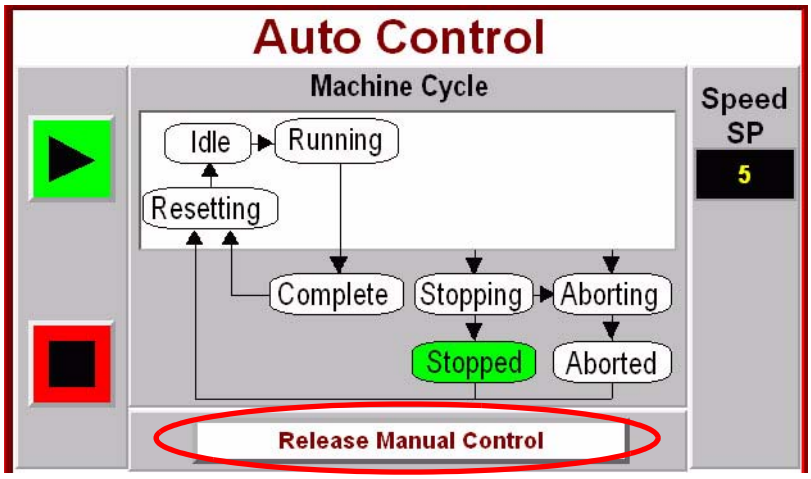
Your HMI also must be running in order to issue the commands to the controller.

1. Expand the P00_Control program and open the R03_Commands_AUTO routine.



2. Use the Navigation Banner in the HMI to open the Auto Control screen.

3. Verify that the Release Manual Control message is not being displayed. If it is, press the indicator to release manual control.



4. Next, press and release the green button on the HMI to issue the reset command to the machine.

5. Wait for the command to execute during the Resetting state.

6. If the Machine Control graphic indicates the Aborted state, go to Problems in the Aborted/Resetting State below. If it indicates the Idle state, go to Problems in the Idle or Running State on page 129.

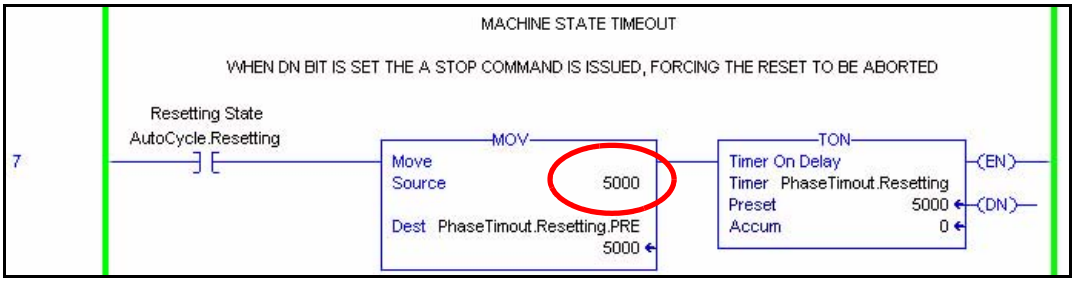
Problems in the Aborted/Resetting State

The Aborted state indicates that the resetting actions failed to complete within the time allotted by the timer PhaseTimout.Resetting. Perform the following steps to correct this condition.

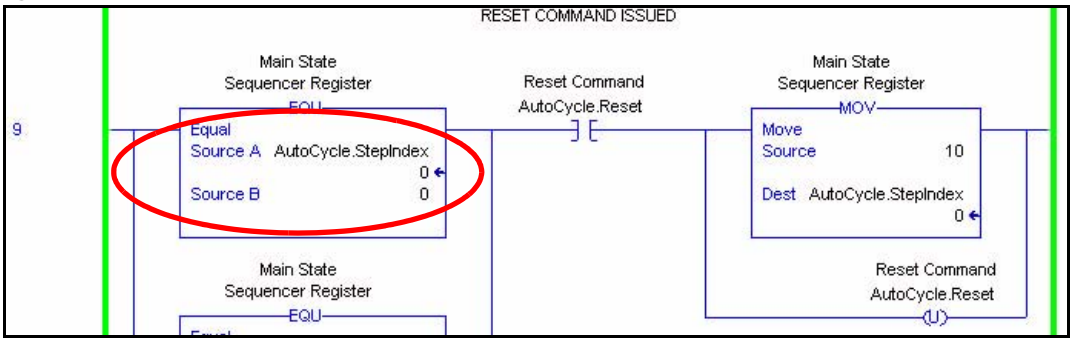
1. Move to rung 7 of the R03_Commands_AUTO routine.

2. Verify that the value being moved into the preset for this timer is long enough for your machine to complete the tasks in the initialization routine. The initialization routine, found in the individual axis programs, includes such things as moving each axis to the desired starting position.

3. If you suspect this is the problem, increase the value and try the reset command again.



4. If this is not the problem, move to rung 9 of the R03_Commands_AUTO routine and carefully note what value is in the AutoCycle.StepIndex register as you press the green reset button again on the HMI.



5. Use the table below to determine where the cycle is stopping and what action to take next.

If AutoCycle.StepIndex =	The current state is:	Take this action:
0	Stopped	Go to Correct Aborted/Resetting State Problem: Reset Command Is Not Commanding Any Action.
10	Resetting	Go to Correct Aborted/Resetting State Problem: AutoCycle.StepIndex Stops at 10.
20	Resetting	Go to Correct Aborted/Resetting State Problem: AutoCycle.StepIndex Stops at 20.

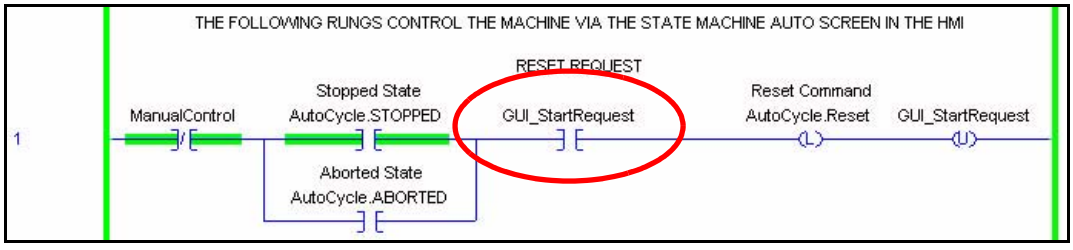
Correct Aborted/Resetting State Problem: Reset Command Is Not Commanding Any Action

The reset command is not commanding any action. Perform the following steps to correct this condition.

1. Observe the logic on rung 1 of the R03_Commands_AUTO routine.

2. Verify that the start request is coming from the HMI.

3. If not, make sure that your controller is in Run Mode and the HMI is communicating properly with the controller.



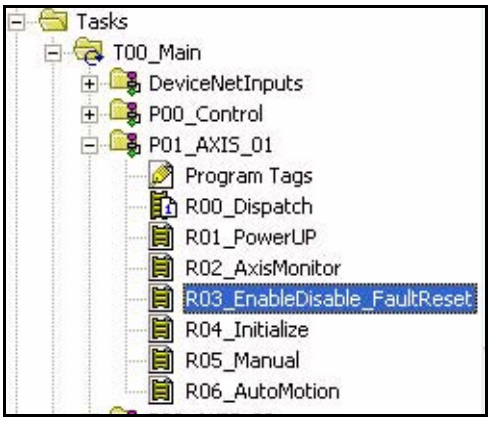
Correct Aborted/Resetting State Problem: AutoCycle.StepIndex Stops at 10

If the AutoCycle.StepIndex stops at 10, the Axis_*nn*_CMD.Reset command is failing to clear the faults on the servo drive and the resetting state is not completing. Perform the following steps to correct this condition.

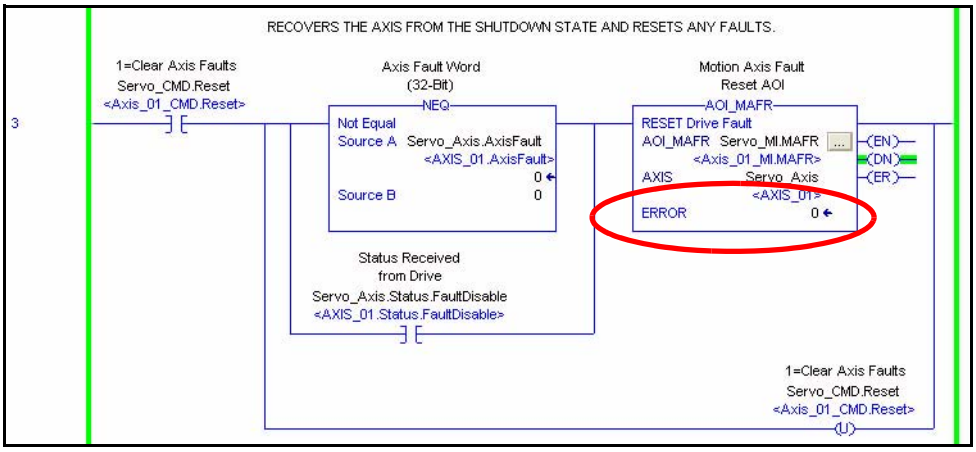
1. Observe the logic that begins at rung 10 of the R03_Commands_AUTO routine.

2. Scroll down through the subsequent rungs and identify which drive is not setting the Axis_*nn*_Status.OK bit and expand the associated P*nn*_AXIS_*nn* program.

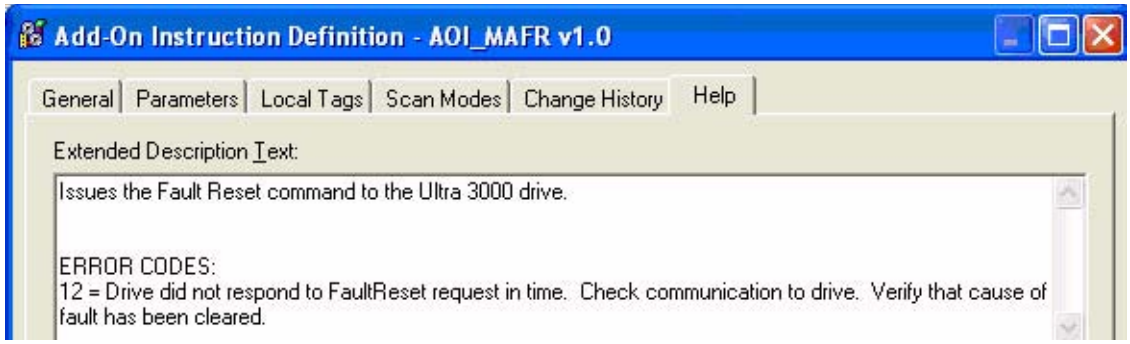
3. Open the R03_EnableDisable_FaultReset routine for this axis.



4. Move to rung 3 of this routine and note the value of the ERROR word shown on the AOI_MAFR instruction.



5. Click on the AOI_MAFR instruction and press the F1 key for assistance with the error code.

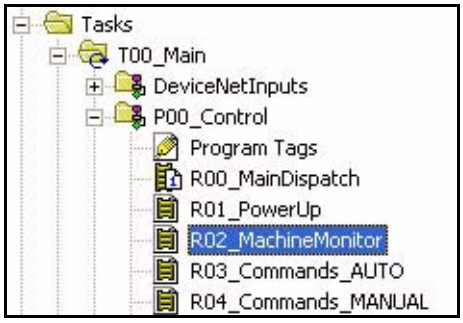

Add-On Instruction Definition - AOI_MAFR v1.0
General
Parameters
Local Tags
Scan Modes
Change History
Help
Extended Description Text:
Issues the Fault Reset command to the Ultra 3000 drive.
ERROR CODES:
12 = Drive did not respond to FaultReset request in time. Check communication to drive. Verify that cause of fault has been cleared.

6. Follow the instructions shown for the associated ERROR CODE and execute the reset command from the HMI again.

Correct Aborted/Resetting State Problem: AutoCycle.StepIndex Stops at 20

If the AutoCycle.StepIndex stops at 20, the axes are not completing their initialization procedure which includes enabling each drive and commanding the axis to a starting position. Perform the following steps to correct this condition.

1. To find the source of this problem, open the R02_MachineMonitor routine in the P00_Control program.



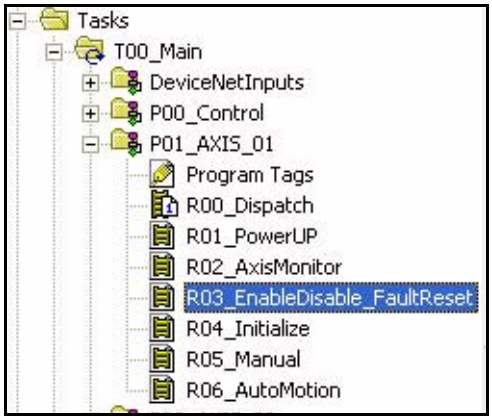
2. Observe the axis condition logic that begins at rung 8. All axes should show the Axis_*nn*_Status.ConfigComplete status as active (set). Check the communications to any drive that is not configured.

3. Move to rung 9 and verify that all Axis_*nn*_Status.DCBusCharged status bits are active (set). Check the incoming power and fuses or disconnects to any drive that has no DC bus power.

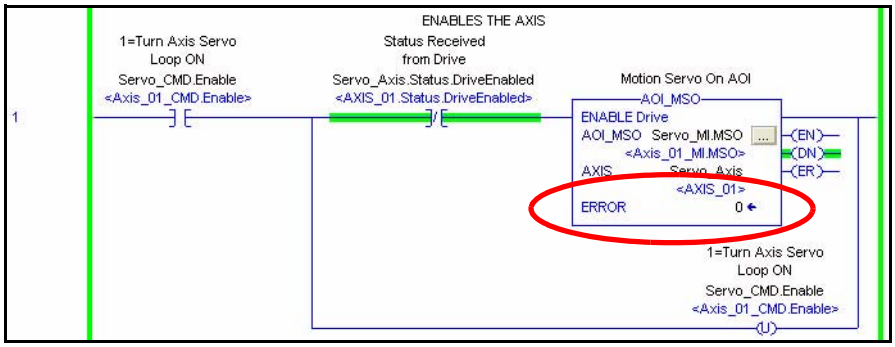
4. Move to rung 11 and verify that all Axis_*nn*_Status.Enabled status bits are active (set). For any drive that is not enabled, perform these substeps.

a. Expand the associated P*nn*_AXIS_*nn* program.

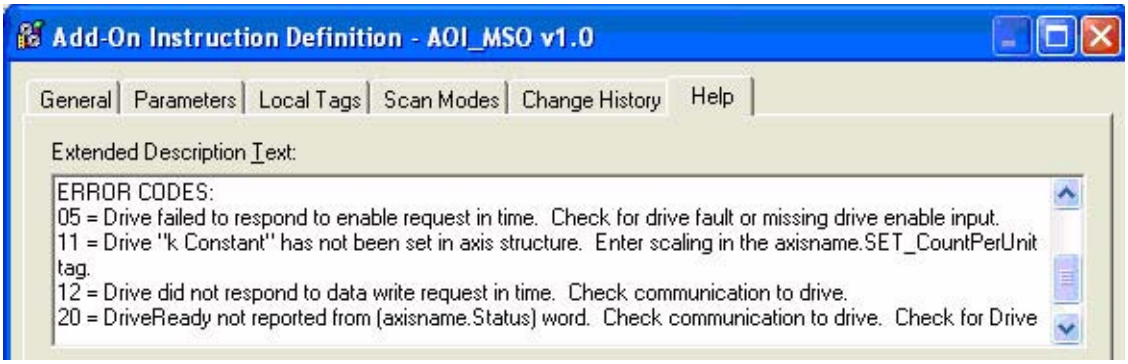
b. Open the R03_EnableDisable_FaultReset routine for this axis.



c. Move to rung 1 of this routine and note the value of the ERROR word shown on the AOI_MSO instruction.



d. Click on the AOI_MSO instruction and press the F1 key for assistance with the error code. You may need to scroll down to find your error code.

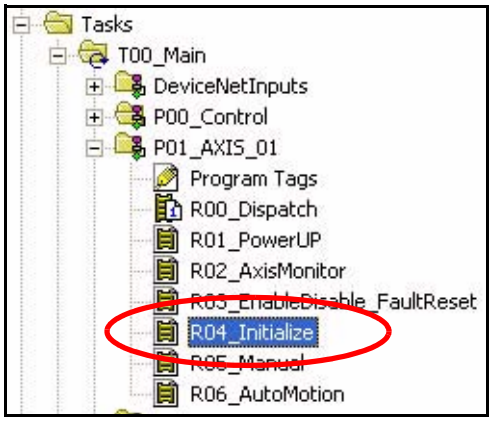

Add-On Instruction Definition - AOI_MSO v1.0
General
Parameters
Local Tags
Scan Modes
Change History
Help
Extended Description Text:
ERROR CODES:
05 = Drive failed to respond to enable request in time. Check for drive fault or missing drive enable input.
11 = Drive "k Constant" has not been set in axis structure. Enter scaling in the axisname.SET_CountPerUnit tag.
12 = Drive did not respond to data write request in time. Check communication to drive.
20 = DriveReady not reported from (axisname.Status) word. Check communication to drive. Check for Drive

e. Follow the instructions shown for the associated ERROR CODE and execute the reset command from the HMI again.

5. Move to rung 11 of the R02_MachineMonitor routine in the P00_Control program and verify that all Axis_ *nn*_Status.Initialized status bits are active (set). For any drive that is not initialized, follow these substeps.

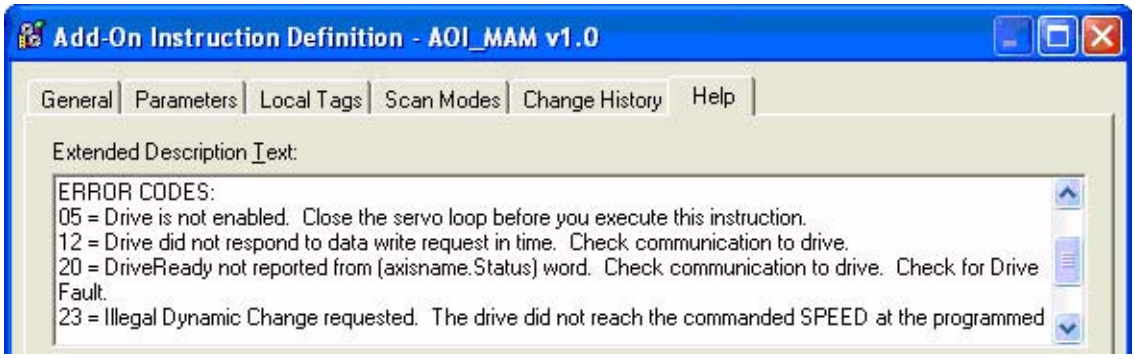
a. Expand the associated P*nn*_AXIS_*nn* program.

b. Open the R04_Initialize routine for this axis.



c. Move to rung 4 of this routine and note the value of the ERROR word shown on the AOI_MAM instruction.

d. Click on the AOI_MAM instruction and press the F1 key for assistance with the error code. You may need to scroll down to find your error code.


Add-On Instruction Definition - AOI_MAM v1.0
General
Parameters
Local Tags
Scan Modes
Change History
Help
Extended Description Text:
ERROR CODES:
05 = Drive is not enabled. Close the servo loop before you execute this instruction.
12 = Drive did not respond to data write request in time. Check communication to drive.
20 = DriveReady not reported from (axisname.Status) word. Check communication to drive. Check for Drive Fault.
23 = Illegal Dynamic Change requested. The drive did not reach the commanded SPEED at the programmed

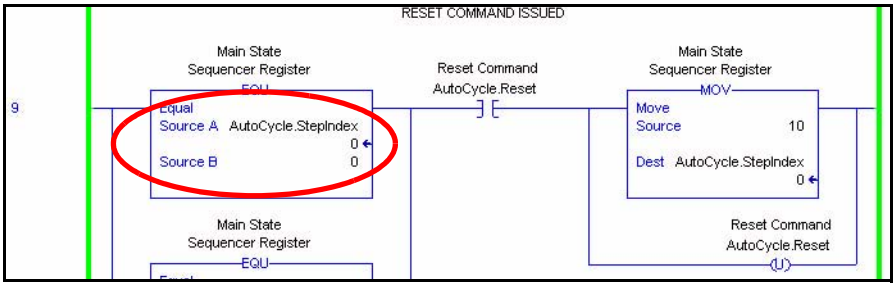
e. Follow the instructions shown for the associated ERROR CODE and execute the reset command from the HMI again.

Problems in the Idle or Running State

- If the state machine makes it to the Idle state, it will most likely go to the Running state as well. Press the green button on the HMI one more time to move to the Running state.
- If the state machine graphic shows that it has moved to the Running state but the machine is not behaving as expected, the problem probably is located in one or more of the axis programs. Perform the following steps to correct this condition.

1. Open the R03_Commands_AUTO routine and move to rung 9.

2. Carefully note what value is in the AutoCycle.StepIndex register.



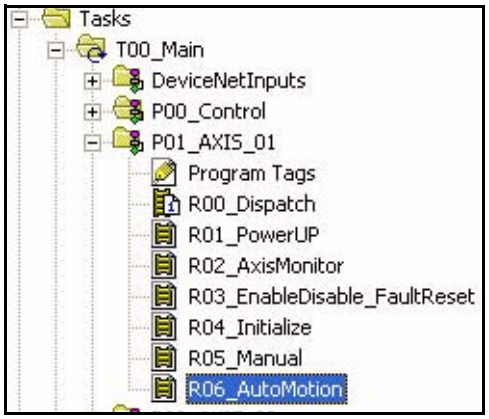
3. Use the table below to determine where the cycle is stopping and what action to take next.

If AutoCycle.StepIndex =	The current state is:	Take this action:
110	Running	Go to Correct Idle/Running State Problem: AutoCycle.StepIndex Stops at 110.
200	Running	Go to Correct Idle/Running State Problem: AutoCycle.StepIndex Stops at 200.

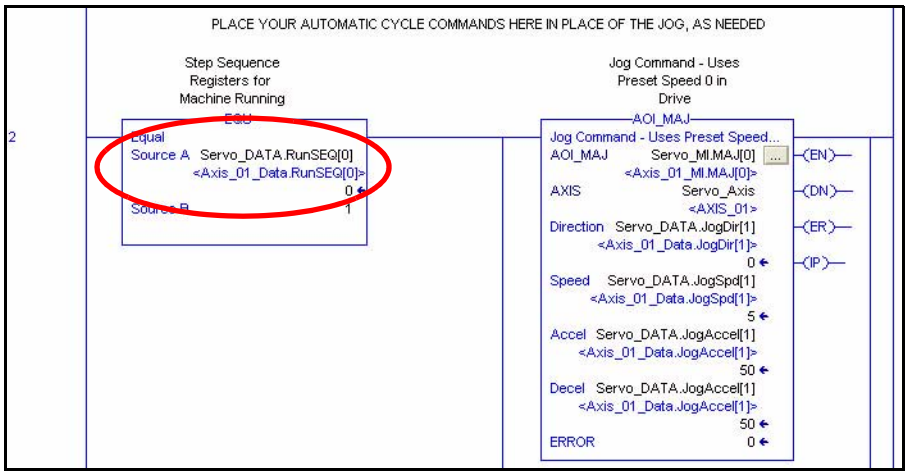
Correct Idle/Running State Problem: AutoCycle.StepIndex Stops at 110

If the AutoCycle.StepIndex stops at 110, one or more of the axes failed to complete the automatic cycle running procedure. Perform the following steps to correct this condition.

1. For each of the axes, expand each of the P*nn*_AXIS_*nn* program and open the R06_AutoMotion one by one.



2. Move to rung 2 of this routine and note the value of the Servo_DATA.RunSEQ[0] register.

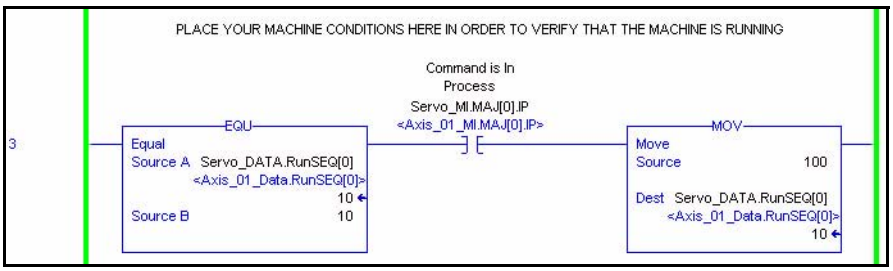


3. If the value in the register is equal to '100', move on to the next axis program and repeat Step 1.

4. If the value in the register is below '100', scroll down the rungs of this routine until you observe where the Servo_DATA.RunSEQ[0] seems to have stopped.

In the example shown below, the Servo_DATA.RunSEQ[0] has stopped at 10. The rung that looks for the value is waiting on another bit before the register can move to 100. Here, the Servo_MI.MAJ[0].IP status bit is not active. The cause of this might be the failure of the

command associated with this status bit to execute. Your application code may differ.



Correct Idle/Running State Problem: AutoCycle.StepIndex Stops at 200

If the AutoCycle.StepIndex stops at 200, the problem is not in the sample code provided in the application template. Perform the following steps to correct this condition.

1. Review the application code that you added for your specific machine in Appendix A of this document.

2. Contact Rockwell Automation technical support for additional assistance.

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Publication IASIMP-QS011B-EN-P — January 2009

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